

# THE LARYNGOSCOPE.

VOL. XXVIII. ST. LOUIS, JANUARY, 1918.

No. 1.

## ORIGINAL COMMUNICATIONS.

(Original Communications are received with the understanding  
that they are contributed exclusively to THE LARYNGOSCOPE.)

### THE TREATMENT OF SUPPURATION OF THE ACCESSORY SINUSES OF THE NOSE.\*

DR. E. B. GLEASON, Philadelphia, Pa.

About three or four years ago my conclusions underwent a radical change regarding the best treatment for suppuration of the accessory nasal sinuses. Previous to that time my inferences were largely the result of association with gentlemen who had received instruction in Vienna or in Berlin and hence I leaned toward their Teutonic opinion that the only adequate treatment of suppuration of the accessory sinuses, in the majority of cases, was complete exenteration by a radical operation, in spite of the fact that in my younger days I had seen a considerable number of acute infections of the frontal and ethmoidal sinuses end in complete recovery under very simple treatment. Gradually, the fact was brought home to me that the number of untoward results, following such radical procedures, as the Killian operation for example, were many; and that the number of dissatisfied patients, as the result of such operations, was greater than could be accounted for by the lack of skill or experience of individual operators. Some of the patients told me that the nasal discharge for which the operation had been mainly undertaken, had only been modified as to its character and amount; that, although the recurrent headaches from which they suffered previous to the operation had somewhat disappeared, they had been succeeded by disagreeable sensations within the nose, probably as the result of the destruction of a large amount of nasal mucous membrane and the formation of cicatrices. The suggestion of Holmes that perhaps the cellular structure of the ethmoidal labyrinth had for one of its functions the protection from cold of the

\*Read at the meeting of the Section of Otology and Laryngology of the Philadelphia College of Physicians, Jan. 17, 1917.

contents of the orbital and cranial cavities, may furnish an explanation of the complaints of some of the individuals who had submitted to the exenteration of their ethmoids; and the persistence of the discharge is, perhaps, to be explained by the presence of orbital ethmoid cells, so situated as to render their complete exenteration difficult or impossible by even the most complete Mosher or Killian operation.

The two following cases illustrate the conditions sometimes following so-called "successful" radical operations on the ethmoid labyrinth. A gentleman had his right ethmoid removed by Ballenger's method. The specimen removed was large and apparently contained most of the ethmoid cells. The mucous membrane lining them was greatly thickened and almost polypoid in places. The results were so unsatisfactory that a year or more after the operation he told me that he was insufflating a powder of Bulgarian bacillus which he thought gave him more relief than the operation. In one of my own cases I removed the left ethmoid labyrinth and opened the sphenoid by Mosher's method. My patient disappeared; but a year or more afterwards, Dr. Brophy, who had referred the case to me, reported that the vision of the left eye, which had been greatly impaired before the operation, was now almost completely restored. The sight in the right eye was also somewhat impaired but the patient was unwilling to submit to an operation on the right side of her nose, similar to that done on the left.

I cannot help feeling that the status of radical operations on the nasal accessory sinuses is worse than that of the radical mastoid operation, which is, of course, sometimes necessary to save life, but which, in its final results, sometimes leaves a less satisfactory condition than if no operation had been done and sometimes requires much after treatment, from time to time, to prevent recurrent suppuration. In other words, one pathological condition has been substituted for another; and it is a gross exaggeration to speak of such results as a "cure." My belief is that radical mastoid operations, but more especially radical operations on the accessory nasal sinuses, are justifiable in only a very limited number of cases, and in most instances, only after every other method of treatment has failed to yield even fairly satisfactory results. A radical mastoid operation, of course, sooner or later becomes imperative in cases of extensive cholesteatoma and a radical operation on the ethmoids in cases of necrosis, malignant disease and probably in some other conditions; but the condition of the mucous membrane lining any of the nasal accessory sinuses must be very

bad indeed to prevent its recovery to something resembling a state of health as the result of ventilation and drainage of the affected sinus.

My attention was first directed to the value of suction in the treatment of suppuration of the accessory sinuses by Dr. MacWhinnie, of Seattle. His statement, as I remember it, was that he had done more than sixty radical operations on the accessory sinuses, of which two had been followed by death; and that since that time he had done no radical operations, but had succeeded in bringing about much more satisfactory results by means of a suction apparatus which he described to me. Since my interview with MacWhinnie, I have done no operations on the accessory sinuses except on the antrum; not even to the extent of removing the middle turbinate to improve drainage and my results have been practically the same as those described by MacWhinnie.

So many kinds of suction apparatus are now offered for sale by instrument makers that it seems hardly necessary to describe the one before you. Any apparatus that will quickly produce a partial vacuum within the nose will answer a good purpose. It should be of sufficient capacity to allow for a certain amount of leakage about the nose-piece and still maintain negative pressure within the nose. Before using the apparatus 2 per cent cocain is applied to the parts about the openings of the sinuses from which it is desired to remove secretions in order to remove any swelling that might obstruct these openings and I usually follow the use of the pump by injecting 10 per cent argyrol into these localities with a long, nozzleed hypodermic syringe, in the manner described in a previous paper, with the object of removing any inflammation of the mucous membrane about the ostii that may be present.

The suction apparatus should be provided with a vacuum gauge and controller by which the exact amount of suction can be regulated. In my earlier experiments this was accomplished by the use of rubber tubing of various sizes and which consequently collapsed as the result of different amounts of suction. This was MacWhinnie's method as described to me; and as far as I know, neither of us was aware of any gauge that would control the amount of vacuum produced by the pump. The gauge that is before you, is divided from one up to thirty and each division represents the weight of an inch of mercury, drawn up by the suction, so that if the gauge stands at thirty, it indicates that approximately a perfect vacuum is being maintained, because the height of the column of mercury in a barometer that the pressure of the at-

mosphere will sustain, is only about thirty-two inches. However, a negative pressure within the nose and accessory sinuses of much over twenty inches of mercury is often painful and usually causes hemorrhage by the suction of blood from the inflamed mucous membrane. The use of the apparatus produces two results. In the first place, it empties a sinus more or less completely of any mucus or pus it may contain. This is best accomplished by a remittent action of the apparatus; that is, the suction is continued only for a moment, then air is admitted into the sinuses by loosening the nose-piece and again immediately aspirated. This process is repeated until secretions cease to be drawn from the nose. Probably the nose-piece, designed by Dr. Coffin of New York City, would be of some advantage for this purpose, although I have had no experience in the use of this apparatus. However, the most important effect of the treatment is the production of hyperemia which is best secured by maintaining the suction steadily for ten or fifteen minutes. The nose-piece of the instrument is inserted into the nostril in such manner as to secure an airtight joint, and the other nostril closed by the finger of the operator. A vacuum within the nose results when the posterior nares are closed by the elevation of the soft palate which either occurs spontaneously or is brought about by the patient pronouncing "ka." The patient breathes through his mouth during the time the instrument is being used; and can talk if he wishes to, but his voice, because of the position of the palate, has a somewhat nasal tone. Many of the patients soon learn to manage the nose-piece of the suction apparatus for themselves and maintain a more or less animated conversation while it is being used. Its action on the intranasal structures, as MacWhinnie somewhat picturesquely expressed it to me, is that of a combination vacuum cleaner and Beals congestion apparatus.

The use of the instrument has sometimes proved of value as a time-saver and an aid to diagnosis. If, after cleansing the nose with a syringe, instead of waiting for an overflow of pus from the infected sinus, the pump be applied, a sufficient amount of pus will be immediately aspirated to indicate the position of the cells from which it was excreted. However, in most instances, unless the pump is used with care, the flow of pus is so abundant that it is impossible to tell exactly from what locality it came.

The experience in three cases would seem to indicate that nasal polypi are not as apt to recur if, after their removal, the pump is used at intervals of two or three days for a time.

In a case of mild atrophic rhinitis with small crusts on the middle turbinate, the use of the pump seemed to prevent the formation of crusts so that ozena disappeared. However, the case relapsed some months after an apparent cure of the ozena had been accomplished and is still under occasional treatment. As no pus was ever drawn out with the pump, it is probable that the improvement was due to the artificial congestion of the atrophied tissues and that there was no concomitant accessory sinus suppuration.

The following cases are selected to illustrate the results obtained in acute and chronic suppuration of the accessory sinuses:

1. *Severe acute frontal sinusitis.* Patient stated that this trouble dated back to an attack of grippe three weeks before. Since that time he had had pain over his right eye, so severe at times, that he had thrown himself on the floor in his agony and distress. The right frontal sinus was very tender to pressure and much darker than the other by transillumination. The anterior extremity of the right middle turbinate was swollen and red, but no pus was visible flowing from beneath it. However, suction removed apparently a drachm and a half of bloody muco-pus. The patient called on two other occasions at intervals of two days; but it was impossible to remove any secretions with the pump; all pain had disappeared and he was apparently well. After relating my experience in this case to Dr. M., a Philadelphia physician, he stated that a relative of his had had precisely similar symptoms for about the same length of time and without his knowledge had consulted a specialist who advised an immediate operation. The fee demanded was so large that the patient sought Dr. M., who treated him with hot applications over the sinus and sprays. The result was the discharge of a large amount of pus from the nose and a spontaneous recovery. Probably, many general practitioners have had similar experiences as regards acute frontal sinus suppuration and radical operations in such cases are not indicated until milder methods, including suction, have been tried and found unavailing.

2. *Acute suppuration of the anterior ethmoid cells with orbital abscess.* The patient complained of headaches over the left side of the head and eye. The left upper eyelid was slightly edematous and the middle turbinate swollen with muco-pus flowing from beneath it. The pump removed a considerable amount of pus from the anterior ethmoid cells and all symptoms were greatly alleviated, including the edema of the upper eyelid. Suddenly the edema of the upper eyelid increased and Dr. Ring, who saw the case with me, incised the swelling and opened an orbital abscess. The abscess

was syringed with boric acid solution and the use of the pump continued, at intervals of two days, with the result of a complete subsidence of the ethmoidal and orbital suppuration.

3. *Acute suppuration of the right frontal sinus.* The patient was a student in the Law Department of the University and was referred to me by Dr. John Brophy. The patient stated that he was unable to study because of severe pain over the right eye which often became agonizing at night. There was tenderness on pressure over the sinus and it was darker by transillumination than the left. There was no pus exuding from beneath the middle turbinated body; but the pump removed a considerable amount of pus which grew less with each successive treatment. Until after seven or eight daily visits it was impossible to remove any secretions. In the mean time all symptoms subsided. Some weeks afterwards the patient came to me complaining of a slight return of the pain over the sinus. This promptly disappeared after the removal of a small amount of mucous with the pump.

The above three cases illustrate the method of treatment and results in acute cases. None of them might be classed as "fulminating" where high temperature, severe pain and symptoms of commencing meningitis indicate immediate operation. During the interval since the writer began using the pump, he has not had a case of this kind in his practice and all of his acute and sub-acute cases have resulted in prompt cures. The chronic cases treated were somewhat numerous and a number of them had previously been operated on unsuccessfully. These apparently responded more slowly to treatment than those upon whom no operation had been done. One case, evidently syphilitic, improved greatly as far as pain and sight were concerned, under iodide of potassium and the use of the pump. The case was complicated by an orbital abscess which had been discharging for eighteen months when first seen. The ethmoids on both sides and the left antrum were suppurating. The case became very irregular in her attendance and finally disappeared and was probably operated on elsewhere. The following have been selected as illustrating the results of treatment in chronic suppurations:

4. *Chronic suppuration of the frontal sinus, anterior ethmoid cells and antrum.* The patient was a young Greek, who was referred for a submucous resection of the upper anterior portion of his nasal septum, where it deviated toward the left in such a manner as to be in close proximity to the middle turbinated region. There was a considerable amount of pus in this locality and the

left antrum also contained pus. In the forehead was the scar of a Killian operation. A small amount of the nasal end of the orbital "bridge" had disappeared, so that there was a slight deformity, partly concealed by an abundant eyebrow. What remained of the frontal sinus contained pus. No submucous operation on the nasal septum was done. A permanent opening into the antrum beneath the inferior turbinate was made with a rasp and the suppuration in this cavity treated by syringing, as well as the use of the pump with the result that the suppuration somewhat promptly ceased. Suppuration in the ethmoid cells also ceased. However, this patient still sees me occasionally when, as the result of a cold, slight pain or discharge makes him fearful that there may be danger of a return to his former condition.

5. *Chronic suppuration of the left frontal sinus.* This patient was one on whom I had done a mastoid operation seven years before. For the past two years, he stated, that he had had pain over the left eye with gradually decreasing acuteness of vision. On February 14, one or two drams of pus were removed by the pump from the frontal sinus and anterior ethmoid cells. Pain disappeared and the acuteness of vision rapidly improved. From February 14 until March 1, the pump was used nearly every day and then practically every other day until March 18, and from then on at lengthening intervals until April 24, by which time all symptoms had disappeared.

6. *Chronic suppuration of the posterior ethmoids and sphenoid.* This patient was a professional nurse, who stated that she had suffered from headaches on the left side of the head for the past two years, sufficiently severe to interfere with her working steadily at her employment. However, she had accepted a position in a private hospital in the city, with the understanding that one of her friends, another nurse, employed in the same institution, would take her place when she was unable to work. There was suppuration of the posterior ethmoid cells and the sphenoid of the left side. Pus was removed each day, in decreasing amount, by the pump, from these cells for about a month after which her visits to the office were at less frequent intervals. There were no headaches after beginning treatment and finally no pus could be removed with the pump. In this case there had been no relapse during the year or more during which the patient was under observation, after discontinuing treatment; and she was able to work steadily at her employment.

2033 Chestnut Street.



### LYMPH ANGIOMA OF THE LARYNX.\*

DR. CHARLES W. RICHARDSON, Washington, D. C.

True angioma of the larynx is of rare occurrence. Dr. Emil Mayer of this association read at the thirty-eighth annual meeting, held in Washington, May 9, 1916, a paper entitled "Angioma of the Larynx." In this paper he brought up the then published reports of growths of this character to the number of forty-one. In the critical resume of the reported cases, I find none that present physical or gross appearance or pathological findings corresponding to the growth which forms the subject of the paper which I now present to you.

I was requested to see M. J. C., male, 32 years of age, at his residence, by his family physician, July 21, 1916. I was told that the patient had considerable difficulty in breathing and deglutition. The patient was a man of dark complexion, five feet, seven inches in height and weighed 131 pounds. He stated that during the year 1906, his voice became muffled and as a result of a laryngoscopic examination a tumor had been noted in his larynx. His voice was muffled at my examination, not hoarse. His breathing was fairly easy. What particularly impressed me was his frequently throwing his head upward and at the same time making an empty swallow. I questioned him as to the reason for this movement, and he stated that it enabled him to breathe easier. He complained more of his inability to ingest food. He said that he had lately lost flesh very rapidly on account of his inability to swallow. On closer inquiry I learned that this was due to the fact that his breathing became so embarrassed during deglutition that he feared to take nourishment. There was no stridor in breathing. His breathing was very much embarrassed at night, choking spells coming so frequently that he had had practically no continuous sleep for weeks. The history further brought forth the fact that he had been under treatment by several laryngologists and had been seen in consultations by physicians and surgeons. The impression seemed to have been created that the growth was malignant; that an operation might be attended with a fatal issue; and that in all probability it would be wiser to let the disease follow its natural course.

Examination of the nose and fauces revealed nothing abnormal.

\*Read before the American Laryngological Association, May, 1917.



*Examination of the larynx:* The view of the larynx was made without difficulty and without apparent discomfort to the patient. The picture revealed in the mirror was quite astonishing. A large bluish grey mottled mass filled in the whole supra-cordal portion of the larynx. It was a smooth, rounded, even growth without ulceration. It was soft and pultaceous to the feel as transmitted through the probe. None of the deeper portions of the larynx were visible. The growth evidently had its origin from the right false cord, the whole right ventricular wall extending as high as the right ary-epiglottidean fold and posteriorly to the arytenoid. It extended over to the opposite wall, resting on the left false cord and extending nearly on a level with the left aryepiglottidean fold. I could see no place through which the patient gained access of air. I re-



Fig. 1.

quested that the patient be brought to my office for a more thorough examination the next day. I now understood the peculiar head movement and empty swallowing. This movement evidently raised the growth so that the air passed more freely through the space thus opened.

By the morning when the patient reported, I had come to several conclusions.

First. The growth was probably not malignant. In seven years, if carcinomatous, it would have shown ulceration. If a melanoma-sarcoma, which it most resembled, it would have been fatal.

Second. While it had a possible resemblance to an angioma, it had not all the physical features, nor the hemorrhagic history. Therefore, I doubted it being a true angioma.

Third. I determined to make the necessary test as to whether it should be removed endo-laryngeal or through laryngo-fissure. That is to determine its possible hemorrhagic nature.

After examining the patient a second time, at my office, under more favorable circumstances, and more thoroughly elucidating all the points I wished to settle, I cocaineized the larynx, and then plunged a laryngeal knife well into the center of the mass. I was gratified to find that my confidence was not misplaced, as only a trivial bleeding ensued. As a result of this examination endo-laryngeal removal was decided upon.

On July 24, 1916, the patient was operated upon at the Episcopal Eye, Ear and Throat Hospital. All preparations were made for any eventuality that might occur. The patient's pharynx and larynx were thoroughly cocaineized with a 20 per cent solution of cocaine. The patient offered unexampled aid. Several attempts were made to encircle the growth with the wire of the snare, but the wire would not slip beneath the growth. As a last resort, I introduced my left index finger into the larynx, raised up the tumor from the left side of the larynx and forced the wire around the mass, drew the wire taut and then evulsed the mass. There was very little bleeding—about a teaspoonful in amount. Immediate examination revealed that the growth had been removed in its entirety. Both vocal cords were visible in their pearly white appearance. The next day the line of attachment was readily recognized from the greyish-white wound surface. This extended from the false cord upward along the ventricular wall to the border of the ary-epiglottidean fold, and posteriorly to and encircling the arytenoid, on the right side.

The growth, as removed, showed a large pultaceous mass, of a bluish, grey mottled appearance. From the severed surface could be seen fairly large, lymph or venous sinuses from which a syrupy bloody fluid could be seen to escape on pressure applied to the mass. The growth measured five centimeters in length, three centimeters in breadth and two and a half centimeters in depth.

After the growth was photographed by Harris and Ewing, it was submitted to Dr. John B. Nichols for pathological study. The report is as follows:

"Memorandum of microscopic examination of laryngeal tumor, removed July 24, 1916, from Mr. Maurice Collins."

"The neoplasm is composed mainly of fairly firm fibrous tissue, arranged in the interior in plicated, branching and villous form enclosing an extensive series of cavernous sinuses. These sinuses, which account for the collapsibility of the tumor, do not seem to contain blood, and are, perhaps, lymph sinuses. The tumor has a covering of stratified squamous epithelium. Peripherally (in the subepithelial zone) small blood vessels are plentiful. Large ex-

travasations of blood are present in the fibrous substance, containing abundant pigment granules (not melanin). At a few small points the fibroblasts are closely aggregated, probably points of active growth rather than sarcomatous development. The tumor may be designated a hemorrhagic cavernous fibroma (or lymph-angioma)."

When we come to consider the growth, we find several interesting features. The growth is of unusual size for a laryngeal neoplasm; its color and gross appearance made it difficult to reach a definite conclusion as to its nature; and the apparent absence of difficulty in breathing with such a large neoplasm filling the whole vestibule of the larynx.

The method of operative procedure in dealing with this type of growth, especially the true hemangioma is only by laryngo-fissure. The endo-laryngeal removal is fraught with too great a danger to the patient on account of the severe, possibly uncontrollable hemorrhage, that might ensue. The elimination of the hemorrhagic danger in this case, through puncture of the growth, was the only reason of my resorting to the simple and less dangerous method of endo-laryngeal enucleation.

1317 Connecticut Avenue.

---

**The Lingual Tonsil.** J. L. MAYBAUM, *New York Med. Jour.*, May 12, 1917.

The only effective treatment for hypertrophy of the lingual tonsil is its complete removal. The operation is performed under 10 per cent cocaine with an instrument specially adapted for this purpose, such as the Myeles lingual tonsillotome. Hemorrhage, which for a time may be profuse, ceases after applying pressure with a swab moistened in 1 to 2000 adrenalin. Temporary relief may be obtained by patients refusing operation, by local application of 5 per cent silver nitrate, Mendel's sol., etc. Lingual varix, if responsible for the symptoms is best treated by means of galvanic cautery under local anesthesia.

ED.

## THE ETIOLOGY OF SPEECH DEFECTS.\*

MRS. MAY KIRK SCRIPTURE, New York City.

*General Considerations.* In presenting this and the series of articles which is to follow we have endeavored to consider the several speech defects genetically and as they confront one who is called upon to deal with them from the side of therapeutics, rather than as abstract problems for research. This aspect of the problem, we may say, is the most pressing and has given rise to the greatest part of the literature on the subject, as well as to the controversies, which in most cases seem to be as old as the literature itself. And it is not difficult to understand the situation.

Given a population where so many varied elements have entered into the making of their language, and economic conditions conducive to nervous disorders of every sort, it is to be wondered that our "American tongue" has evolved as happily as it has. The presence of numerous speech difficulties is to be expected. Our statistical information upon the subject of speech defects is, perforce, inclined to be unreliable since the data has been largely gathered by individuals and in limited areas; but certainly the attempts to present the facts strike one with the reality of the situation with which we, whose profession it is to deal with them, are confronted.

On the basis of certain careful estimates it is claimed that there are approximately half a million speech defectives in the United States. This number is much in excess of the number of the blind, the deaf and the dumb, the insane or the feeble-minded.

Defects of speech are considered to be of more scientific value in some other countries than in the United States. In 1816, under the minister of education, Mr. Gossler, the German government began activities on behalf of these defectives, which have not ceased. Owing to the late Dr. A. Gutzmann and his son, Dr. H. Gutzmann, the University of Berlin has been the source from which teachers from various cities of Europe have secured training for service in

[Editor's Note.—This is the first of a series of articles on "Speech Defects" to be contributed by Mrs. Scripture, who is Instructor in Speech and Director of Speech Correction, Neurological Department, College of Physicians and Surgeons, Columbia University and Assistant on the Medical Staff of New York City Children's Hospitals and Schools, Randall's Island. The series of articles will embrace the entire field of disorders in speech-etiology, diagnosis and treatment.]

the schools. Japan, through the activities of Isawa, has also taken an interest in the problem. Until the present moment this subject in the United States has not received its due scientific attention, while the practical handling of the subject has been almost totally neglected.

The controversy as regards the nature of the particular speech defects must go on—and as individuals, we must contribute to it, if only to keep the issue alive. But in the meantime we must, as it were, keep the skirt of our already gleaned information closely about us and tentatively organize it into such form as to be of greatest utility. The reason is apparent. The difficulty of the individual is real and urgent and impels itself upon us for solution. While the background of the future may be obscure, the outline stands out clearly and will not be set aside. We have to meet it as best we can and in this respect we are not worse off than in other fields of medicine.

But we Americans, who speak the English language, are no longer to be reproached for our inattention to the subject of speech disorders; for during the past year or two numerous cities all over the country have started, in their public schools, systematic special arrangements for speech improvement, sending special teachers to the speech experts to study their methods. This movement deserves the highest commendation, for should not the "glory of our English tongue" be upheld? Refinement of manner, of dress, of person is always desirable; ideas of cleanliness and neatness are more and more respected. Young men spend much thought on the shape of their collars, and the shade of their ties; and young ladies on the thousand and one little things that go to make up an attractive appearance; but are they always so particular about the shapes and shades of their vowels or consonants, that their speech may be as attractive as their persons? Slovenly language should no more be accepted than slovenly manners.

It has long been recognized that the average American voice is shrill, and the speech careless compared to the voice and speech of an Englishman. The "National Council of the Teachers of English" recently authorized the organization of a "Committee on American Speech," with the hope of arousing public sentiment upon the subject. Professor Clapp, of Lake Forest, Illinois, states in "The Reformation of American Speech:" "Many have come to realize that our vicious speech habits are a serious handicap to national efficiency. They impair the speed and accuracy of communication, in business as well as in social life; they increase our liability to

disease. Or, to put it the other way around, a general insistence on decent speech—distinct utterance and clear, quiet tone—would not only make life pleasanter, but also would actually enable us to talk faster and be more easily understood in all our business dealings. It would lessen disease, because it would promote better hygiene of the entire vocal tract—mouth, nose, throat, and lungs—among all persons, because it would lead to the detection and correction of thousands of physical irregularities which now go unhelped and almost unnoticed. When a whole population says 'cer'nly' and 'mou'n' for 'certainly' and 'mountain,' the victim of adenoids, of cleft-palates, of bad teeth, is not likely to be caught and cured. Yet a people that has learned the importance of the care of its teeth should not be too hard to convince of the importance of the care of its utterance."

If all this be true of the so-called normal speech, how much more careful and particular are we, who devote our attention to abnormal speech, to be about insisting upon slowness, distinctness, quality of tone, resonance, rhythm, emphasis, breath, and all the other attributes that go to make up correct speech? Correct normal speech must be our standard in the correction of speech disorders.

This series of articles is to be devoted to some theories of speech disorders and explanation of methods used in the correction of stuttering, lisping, cluttering, the speech resulting from various organic defects, and the negligent speech of people in general, and it is hoped that they will meet the demand of the teacher who must undertake the correction of pupils in private and public schools. In a book which is at present in preparation, with the collaboration of Mr. Eugene Jackson, we have carried out in a systematic manner practical exercises for the defects herein described. For our exercises we have chosen the English used in every-day life, simple proverbs, poems and stories. We have avoided absolutely trick sentences which never occur in every-day life, such as the time-honored "Strict, strong Stephen Stringer snared slickly six sickly, silky snakes." To illustrate particular sounds we either use sentences of the kind that the pupil hears and uses or we have culled from literature materials which happened to suit our purposes. There is not a single exercise in the whole book which we have not used and found helpful in our clinics or private practice. They are suitable for pupils of all ages, excepting those in the very lowest grades of the elementary school. In these grades the problem is one rather of prevention than of correction; for the pupil is just forming his speech habits and this is done by insistence upon careful enunciation.

We have explained in the simplest manner the sounds in the English language and provided special exercises for them. Let it be borne in mind, however, that lispers and all other sufferers from speech disorders need drill not only on the particular consonants which give them trouble, but on all sounds, *especially the vowels*. They will be benefited, therefore, as much as the stutterers by going over every exercise in the book.

For practical purposes we have divided the speech mechanism into its four constituents: breathing, phonation, articulation, and thinking, and provided exercises not only for each of these, but also for bringing about a proper co-ordination of the four.

Here possibly is the time and place to say that there would be less correction of speech defects needed in the upper grades of the school if attention to distinct enunciation, articulation, timbre and rhythm were taught in the very first year of school life. Yes, even further back. In the home, where the child gets its first impression of the spoken language, this attention should be started. If parents and guardians would insist, first, upon distinct utterance; second, that there be no baby talk; third, no elision of syllables; fourth, no slang; fifth, no short grunts for polite answers; sixth, no carelessness in thought as well as in speech; seventh, that no nervous habits be allowed to creep into speech, such as hesitation, catching breath, putting "er" on words, etc., much of the time and labor spent on these defects later would be saved and much misery averted.

Dr. Smiley Blanton, in writing of speech defects in children, says: "Speech defects among children have been neglected by both physicians and educators in America, with a few notable exceptions. Dr. G. Hudson-Makuen, of Philadelphia, worked in this field for many years; the careful work of Dr. Scripture, especially in corrective phonetics, is too well known to need comment. Dr. John Reigart, principal of one of the New York schools, must also be mentioned as one of the first American educators to give his attention to this neglected field. Even the education of physicians toward speech defects has been so neglected that often they advise against treatment, and the parents of the children who stutter are assured that the trouble will be outgrown . . ."

Unlike the insane or the feeble-minded, stutterers and lispers possess an intelligence that is normal; hence they are able to carry out detailed instructions, and if trained, to introspect. In our Speech Research Laboratory at the Vanderbilt Clinic, College of Physicians and Surgeons, Columbia University, we are endeavoring to study scientifically the causes and effects of these speech defects and shall from time to time publish in this journal our results.



The experiments we are conducting at present in the laboratory are of two kinds. One has to do with the measurement of the movements of the muscles during speech and of the muscles involved in the function during rest. The question as to whether the stutterer's breathing differs from that of the normal person is still in dispute, though a number of investigators have worked on the problem. Some authors have gone so far as to say that their breathing differs from the normal even during rest. We hope to give some light on the question by taking a large number of breathing curves. Two are taken at once, the thoracic and abdominal. On these curves we take three measurements, the relative length of inspiration and expiration, whether the crests and troughs of the waves are opposite, synchronous, ahead or behind in their phases as compared with each other, i. e., thoracic and abdominal, and note is taken of any peculiarities inherent in the particular individual's breathing or due to the environment or material he is reading or speaking.

The pulse record is taken, sufficiently magnified to show any peculiarities, as well as its sequence.

The movements directly involved in the forming of speech are measured by three tambours. A cap of spring steel is adjusted to the head and braced from the collar bone so as to hold the apparatus perfectly rigid. From this frame is suspended a double "L." On the base of each "L" is located an adjustable tambour. A lever fits under the chin, so adjusted that it follows the movements of the lower jaw exactly.

The laryngoscopes, which have been used heretofore, we have found unsatisfactory, for all that can be measured by a rubber diaphragm pressed over the larynx are the movements perpendicular to the neck, and these are insignificant as compared with the parallel movements. The instruments we are using at present consists of a "U" which fits tightly against the larynx and records through a lever, just as in the case of the chin movements.

Most investigators who have attempted to record the movements of the tongue have used a rubber bulb or bellows. This is unsatisfactory, for any compression of the bulb against the roof of the mouth causes a disproportionate record. Accordingly, we have arranged a silver mouthpiece which fits the roof of the mouth; a diaphragm is stretched across the bottom of this so that the slightest movement of the tongue is recorded, no other movements, such as the closing of the jaws, can affect the record.

The time is taken in seconds, twentieths and one-hundredths of a second, as desired. A key is arranged to note on the smoked drum each time the patient says a word, so that the material read may be written in the correct position with regard to the movements that took place simultaneously. We thus have eight records taken at one time, which is the maximum of possibility and desire.

The material used during the tests is selected for its emotional content, interest, complexity of phraseology, etc. The more strictly psychological part of the work has not yet definitely taken shape. We may state, however, in brief somewhat of the plan.

It is known generally that the stutterer usually speaks well when alone, that he sings without stuttering, and that he recites and reads better than he converses. On the supposition that "the set of the mind," the *Bewusstseinlage*, the particular attitude or atmosphere under which he is speaking, is a powerful factor in speech, we propose to create artificial sets, or attitudes, and mark the effect on speech.

We are selecting a group of phrases difficult to read; we shall try the stutterer and normal person with this test.

The question of mental imagery is at present so uncertain that we think it inadvisable to attempt the use of any set tests for this purpose. We do propose, though, through introspection and measurement of the time reaction, to ascertain if possible whether the adequate stimulus from the cerebral center is lacking when the patient stutters or whether the difficulty is a purely muscular one. The latter question seems hardly worth the asking, yet the former is so hard of solution and experiment that it is most vexing. The efforts to introspect our speech process are almost futile, yet we are largely dependent upon this method. And as far afield as some of the recent efforts to locate an absent visual or auditory image have gone, they are, perhaps, efforts in the right direction.

In our practical work in the correction of speech defects at the Vanderbilt Clinic our procedure is more along psychological than physiological lines, for the stutterer, although we are well aware that even these measures avail very little where it is necessary for the patient to have, among other things, a complete change of environment, a correction of posture, physical training, respiratory gymnastics, articulation exercises, removal of nasal obstructions, internal remedies, etc. The facilities offered in a large clinic for attention to the vision, hearing, mouth, nasal deformities, nerves, etc., make the work in the correction of speech defects as near ideal as can be reached, and it is under these conditions that four thou-

sand speech cases were treated during the year 1915-16. Such work cannot be carried on without incurring many obligations and acknowledgments of deepest appreciation are due to my chief, Prof. Frederick Tilney, Professor of Neurology at Columbia University, for his constant encouragement and expert advice; to all the other members of the Neurological Department of the Vanderbilt Clinic for their hearty co-operation in diagnosis; to Dr. Otto Glogau for much valuable aid upon the laryngological side of speech defects; to Mr. Arthur DeBra for his psychological and experimental aid, and to Mr. Eugene Jackson for his pedagogical services in the correction of speech defects.

*The Speech Organs.* In order to do full justice to the study of speech disorders, it is necessary, first, to know something of the actions of the human speech organs, not exactly as the laryngologist knows them, but as an ordinary thinking person should who is to be intrusted with a delicate instrument, all the fine points of which are under his control. We shall, therefore, in as simple language as possible, describe these speech organs, using many suggestions from the works of such masters as Mott in "The Brain in Speech and Songs," Fillebrown in "Resonance in Singing and Speaking," and Lewis in "A Handbook of American Speech."

The human vocal organism is practically a stringed instrument, a reed instrument and a whistle, all in one; an instrument which cannot be compared with any other one thing. Comparisons and definitions fail when we consider that the human vocal organs forming this most beautiful instrument are more complex than any other instrument and at the same time capable of imitating nearly every instrument invented by man.

The human vocal instrument has four elements: first, a *motor*, the respiratory muscles and lungs; second, a *vibrator*, the vocal cords; third, a *resonator*, the throat, mouth, and the nasal and head cavities (these three being common to all musical instruments); and, fourth, an *articulator*, the tongue, lips, cheeks, teeth, and palate, which all other instruments lack.

These elements vary in size and proportion as do the variations of all individuals, and each element varies according to the will or the emotion of the individual. This susceptibility to change constitutes a modifying power, which gives that variety of tone quality which is not possible in other instruments. Qualities of tone expressing feelings, such as pain or pleasure, grief or joy, courage or fear, are made possible with this human vocal instrument because of the interaction of the four various parts.

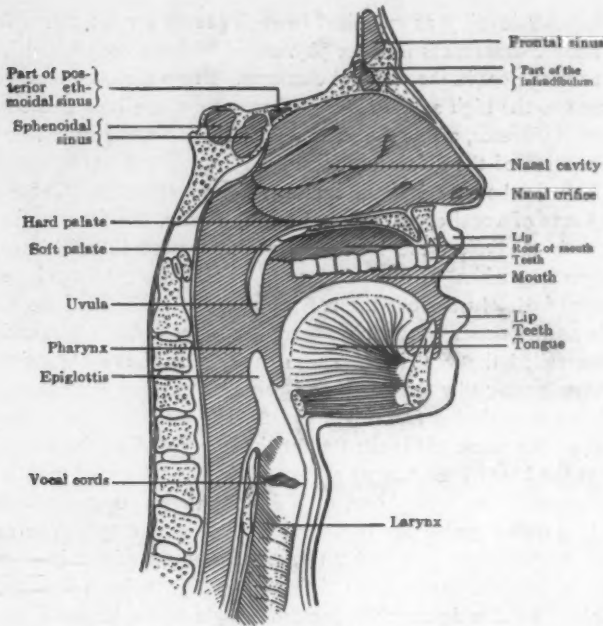


Fig. 1.

This drawing represents a vertical section through the head; the reader should note that the sinuses, like the eyes and the nostrils, lie in pairs to the right and left of the center of the face. The location of the maxillary sinuses within the maxillary or cheek bones cannot be shown in this drawing.

The three sausage-shaped structures within the nasal cavities are called turbinates. They consist mainly of a convolution of blood vessels. Their physiological function is to warm, moisten and purify the inhaled air. Nasal breathing is therefore essential not only to general health but to production of voice. If the turbinates are swollen, due to colds, etc., mouth-breathing has to be resorted to. The cold, dry and dirty air thus inhaled causes catarrhal irritation of the pharynx and larynx with consequent hoarseness. Besides, a stuffed-up nose causes nasal twang that may become a habit even if the acute swelling of the turbinates subsides. Other causes of a stuffed-up nose are a crookedness (deviation) of the nasal septum, the wall that separates the two nasal chambers; and the adenoids, immense swellings of lymph tissues which have reached a size large enough to interfere with nasal breathing and normal speech, which are frequently met with at the junction of the nasal and pharyngeal cavities. The rhinologist can very easily restore to normal function the resonating chambers of the nose, when swollen turbinates, deviated septum or hypertrophied adenoids interfere with the nasal vibrations of voice.

The dark shading denotes the cavities of the throat, nose and head. The relation of the parts is shown more accurately than in any diagram. It will be noticed that the vibrations from the larynx would pass directly behind the soft palate into the nasal chamber, and very directly into the mouth. The nasal roof is formed by two bones situated between the eyes; the sphenoid or wedge bone, which is connected with all other bones of the head, and the ethmoid or sieve-like bone. The structure of these two bones, especially the ethmoid, consists of very thin plates or laminae, forming a mass of air cavities which communicate by small openings with the nasal cavity below. The other nasal accessory cavities or sinuses (frontal, maxillary or sphenoidal) communicate also with the nose, beneath or above the turbinates; the affection of the latter, therefore, easily block off the sinuses. Thus the vibrations of the nose are transmitted to the air spaces above, and the effective qualities of the head vibrations are added to the tone.

(Partly taken from Thomas Fillebrown in "Resonance in Singing and Speaking." Oliver Ditson Co.)

The individuality as exhibited in each person's voice arises from the minute differences in these physical conditions, coupled with the finer differences in the physical elements. From the deep base voice of man to the high soprano voice of woman, these four elements, a motor, a vibrator, a resonator and an articulator, alone enter into the composition of the voice.

The voice-box, or larynx, contains the vocal cords. There are two kinds of vocal cords, the real and the false, the former vibrating with the voice, the latter being only resorted to in case of emergency, when the real vocal cords are inflamed, sore or paralyzed. Just above the real vocal cords, with the false vocal cords as the upper boundaries, there is on each side a large, deep cavity, called the ventricle. These cavities reinforce the primary vibrations set up by the cords and serve to increase their intensity as they are projected from the larynx. The larynx is the vibrating organ of the voice. It is situated at the upper end of the windpipe and at the base of the tongue and is so closely connected with it by attachment to the hyoid bone, to which the tongue is also attached, that it is only possible for slight independent movement. The male larynx is the larger, but in both sexes the larynx of the low voice (alto or bass) is larger than that of the high voice (soprano or tenor). In the male sex the uppermost angle of the larynx forms a marked protrusion, commonly called the "Adam's apple. The less attention given the larynx in singing and speaking, the better. Its relaxation is the essential point to be worked for.

The vocal cords are thickened portions of mucous membrane containing muscular fibers; they extend across the inner surface of the larynx, forming between them the "voice lips," or rima glottidis. They may be compared to the lips of the cornet player on the mouthpiece of his instrument. When the work of the vocal cords is naturally performed, although it is so important, it is in itself light and easy and not at all exhausting. The normal action of the vocal cords will never cause hoarseness if the larynx and all its attending muscles is kept in a relaxed position. The abuse of the vocal cords in preachers, public speakers and military commanders causes impairment or even loss of voice, so-called "functional aphonia."

The epiglottis is the little valve that serves as a cover over the opening of the larynx. It closes the mouth of the larynx when food is swallowed and aids greatly in forming into tone the vibrations made by the vocal cords. There are congenital and acquired deformities of the epiglottis, which naturally cause impairment of the speaking and singing voice.

The pharynx is that part of the cavity in the back of the mouth which extends from the larynx to the nasal cavity. The size of the pharynx varies from time to time, according to its functions; the contraction and relaxation of the muscles in its tissues causes it to perform the act of swallowing. The wider the pharynx is freely opened, the fuller the resonance and the better the tone.

The mouth, or vowel-chamber, lies well in front of an imaginary line passing through the uvula and the epiglottis, or cover, of the larynx. It is floored by the tongue, roofed by the arch of the palate vault, and walled in on the sides by the teeth and the interior surface of the cheeks, the ends being open, but partially curtained at the front by the lips, at the back of the velum. At the junction of the mouth and pharynx, on each side, between two pillars, are located the so-called tonsils. These are lymphoid structures that have a certain function in the metabolism of the system and also in the production of voice. Tonsils must not be operated upon because they are present, as they represent a normal structure. They ought to be removed only, and then thoroughly, if found to be diseased, because they form then a portal of infection. In adults, especially in singers, great care must be taken as the voice sometimes suffers thereby.

The lower jaw serves as the attachment for the muscles of the tongue and those of the tongue (hyoid) bone. It also controls the muscles that adjust the position of the larynx, since the larynx is connected with the hyoid bone. A relaxed lower jaw allows freer action of the vocal cords and ampler resonance.

The office of the soft palate, that part of the roof of the mouth which begins at the highest point and extends backward into the uvula, the pendulous tip, is to separate the pharyngeal from the nasal cavity during the act of swallowing, to prevent the air from escaping through the nose during the phonation of all letters, excepting *m*, *n* and *ng*, and to modify the opening into the nose and thus attune the resonance cavities to the pitch and timbre of the note given by the vocal cords and pharynx. If one could observe the position of the soft palate during vocalization, either by use of a mirror or by kinesthetic sensation, such as is used, it is said, by Helen Keller, for her guidance in speaking and articulation, the uvula in producing a low tone is seen to relax and hang down far forward. As a voice ascends the scale the tension of the soft palate is increased; it is elevated and the uvula shortened, decreasing the opening behind the palate, but never closing it.



As the hard palate and upper teeth which form part of the walls of the mouth are solid fixtures, nothing can be done in training them; but they play their part in resistance and resonance. The lower teeth also serve as walls of resistance to support the tongue during the performance of its functions. The bones of the roof of the mouth are also the floor of the nasal cavity.

The form, size and use of the nasal and head cavities have a wonderful effect upon the resonance of the voice. If the vibrations are strong here, all other parts will vibrate in harmonious actions.

The tongue, one of the articulating organs, has an important part to play in altering the shape of the mouth cavity. When fixing vowel-sounds the body of the tongue should lie as flat as possible, so as to enlarge the mouth cavity. The tip of the tongue should in general rest against the lower front teeth; however, it must frequently touch the roof of the mouth near the upper front teeth when producing *s, z, t, d, n, ch, j* and *l*; the back part of the tongue must rise to close against the soft palate when pronouncing *g* and *k* and hard *c, q* and *x*. Relaxing of this unruly member which is disposed to be rigid, must be constantly insisted upon until a normal flexibility is attained. The lips are also organs of articulation. The lips should have much training, for they must be educated to lift themselves clear and free of the teeth, thus adding one more resonance cavity.

Much practice should be given to dilating the nostrils, as a free, wide, open nose gives a free, well-rounded tone, while contracted nostrils induce the nasal twang so much dreaded. There is a strong tendency to unity of action between the nostrils and lips and soft palate. The soft palate moves downward and forward when the upper lip protrudes and the nostrils dilate, and moves backward and upward when the nostrils are contracted and the upper lip allowed to rest upon the teeth.

The muscles of the face, if educated, are also capable of doing important work. Facial expression, begotten of muscular activity, which the trained speaker has learned, is half his power over his audience, and is the result of much arduous training.

Without properly controlled breathing (for breath is the material for speech), the best speaking tone cannot be produced, hence the breathing apparatus must also be included in the speech organs: these are the muscles of respiration, the diaphragm and the lung.

The respiratory muscles comprise two sets, one for inspiration, and another for expiration. The principal muscles for inspiration



are the diaphragm and the intercostal muscles that elevate the ribs. The chief muscles of expiration are the four sets of abdominal muscles and the intercostal muscles that depress the ribs. The exhalation takes place, however, mostly through the recoiling elasticity of the expanded lungs, followed by mechanical collapse of the snugly adjoining thorax.

The diaphragm forms the floor of the thorax (chest) and the roof of the abdomen, and thus is shaped like an inverted bowl. It is attached to the spinal column behind and to the cartilage at the pit of the stomach in front. In inspiration it is flattened downward by the contraction of the fibers pressing together the organs of the abdomen and by so doing increases the depth of the thorax. The lungs are spongy bodies which have no special activities of their own except a little elasticity, and are controlled by the muscles of respiration.

*Speech Disturbances.* From the medical standpoint we might consider the disturbances of speech, dysarthria, just the same as the neurologist distinguishes the gaits and tremors that are characteristic and diagnostic of the various paralyses, for these disturbances of speech exhibit peculiar forms and expressions. The forms and expressions that these physical conditions take on may be aggravated by organic defects, such as paralyses of the breathing muscles, of the vocal cords, of the throat or face muscles; severe contractions and spasms of the breathing muscles; inactive muscles; defective teeth; defective palate; jaw malformations; tongue-tie; nasal and throat obstructions; imperfect development of the sense organs; impoverished blood systems; shocked nervous systems, etc.

In our experience at the clinic we are able to see not only the patient, but also his parents and relatives whose conditions help to give us a clearer idea of the patient's defects, and we have thus been able to note that hereditary diseases among school children are, of course, prevalent and are often causes of speech defects. If the instructors of these children had a slight knowledge of the symptoms of these diseases the correction of the speech difficulties would be somewhat easier. When nerve disorders that are evident in most children with speech defects are observed, the teacher should know that he must send the child to one of the many neurological clinics that exist in all large cities in connection with authentic hospitals. For suspected nose and throat troubles that may be stubborn factors in the correction of speech defects, the laryngologists at the clinics should be consulted; for the anemic child, the physician who practices general medicine must be seen, and so on, for all the different

disease symptoms that occur. No progress can be made with the correction of speech disorders until the physical condition of the patient has been thoroughly diagnosed and prescribed for; and the diagnostic clinics for this purpose established in different sections of our large cities should be a part of every system for caring for public hygiene.

It often happens, however that the physicians find no difficulty other than the speech defect and yet as one progresses with the diagnosis of the patient from day to day he feels that there is some real difficulty, some disease, behind the anomaly of the speech process. When such is the case there is left but one procedure: Watchfulness. There may be some consolation in the fact that speech disorders are not the only diseases which seem to be purely functional—for other motor mechanisms are often disordered. Hysteria and psychasthenia give rise to a most varied and interesting collection of paralyses and maladjustments which are known to be purely functional and psychic. Among the conditions most difficult to correct we might mention hysteria, diffidence, discouragement, sadness, sensitiveness, stubbornness, mental and moral disturbances, all of which are accompanied by an exhausting, straining, uncontrollable lack of co-ordination, which shows itself oftentimes in physical starters, such as twists and twitching of the head or face, or arms or legs, or breathing muscles. In all the diseases the method of procedure is that of analysis and descriptions of the symptoms—the task of psychology.

As medical science has progressed, it has given ever wider consideration to this branch of its work until it has developed into an independent profession. And when speech cases are met—as is often the case with stutterers—where there is a pronounced lack of interest in anything, a dejected, melancholy attitude, or that reverse condition of hyper-excitability, or an expression of unusual emotion of fear or timidity, it is well to enlist the aid of a psychiatrist.

The peculiar symptoms of the speech defective have led to various descriptions. He has been described as having a diseased personality, or, as the psychoanalysts have put it, he is suffering from a psychic complex. Whatever one's attitude be in this regard it is certain that the teacher can accomplish much by careful observation and patient instruction. Not the least of the things to be done is to remove any factors from the patient's environment which tend to make him timid or discouraged. The most ingenious and unsuspected attempt may secure his interest. It should be constantly borne in mind that persons of this temperament are usually amenable to sug-

gestion, and there is nothing more effective in the therapy of such cases than the influence of a strong and impelling personality: courage and assurance is "catching." Often this is best gained by bringing together for instruction a number of patients suffering from the same defect, for as a rule the most hopeless stutterer will speak well before a class of fellow-stutterers.

Whatever else one may strive to accomplish, confidence in the method of procedure is that of analysis and descriptions of the symptom on the part of the patient should be the first goal-post, for here, if anywhere, the correct mental attitude is the most important part of the journey to success.

The necessity of attempting to solve the problem of speech defects shows itself in the following facts: (1) Speech disorders are common and serious; (2) they are often the concomitant of hereditary disease; (3) they often produce nervous disorders; and (4) they handicap many for life.

Speech disorders should not be allowed to be common and serious. If the parent has not discovered that the child's speech is defective and it is sent to school with defective speech, whether resulting from negligence, disease, fear, fright or conflict of language,\* it is the teacher's duty to at once discover the defect and, if unable to give remedy himself, to see that the child is sent where it can be helped. Speech training is a most important aid in moral training, for the relation of speech to thinking, the substitution of good habits for bad, self-criticism, self-mastery, self-realization, development of will power, all bring about a conscious control. The fundamental technique of speech without its technical terms should be taught to all children in order to overcome self-consciousness. It should not be necessary to go to a teacher of elocution or music to learn that tongue consonants are made with the moving of the tongue and not the jaw; nor to the teacher of music to learn that the mouth must be open to produce good round sounds.

The nervous disorders produced by speech defects might be averted by the care of the infant; kindness and sympathy and help to the foreign child first learning English, and calmness and slowness and helpful manner to the little ones who have just left the home surroundings to enter school life.

Where speech defects have been left uncared for and the poor habits of speech have persisted for years, the handicap is indeed

\*Speech Conflict, A Natural Consequence in Cosmopolitan Cities, as an Etiological Factor in Stuttering. Mrs. May Kirk Scripture and Dr. Otto Glogau. *Journal of Nervous and Mental Diseases*, Vol. 42, No. 1, January, 1916.

great. In many instances the whole character becomes morose, introspective and cynical; in others, whose handicap is even more excessive, it often interferes with education itself and the afflicted one goes through life in ignorance, too ashamed to ask for help and too weak in will power to help himself. Many young men fail to succeed in business because their speech interferes with progress; many young women become victims of hysteria for the same reason. In order to help these disorders we must train teachers who will be living models of correct speech, as well as object lessons in their own characters, and their training in the subjects related to speech—physiological, experimental and educational psychology, physics (sounds), phonetics, gymnastics, music (rhythm), and elocution should be well grounded.

*Definitions.* Discussions of the following definitions will be taken up in the succeeding papers and although many writers of the present day still disagree upon nomenclature, we shall endeavor to make ourselves clearly understood, whether we call one defect by a different name from another or not.

*Aphasia:* The technical meaning of the word is absence of speech. Webster gives an excellent definition of the word when he defines it as "loss of the power of speech or of the appropriate words, the vocal organs remaining intact, and the intelligence being preserved." In other words, the aphasic is one who is affected with a lesion in one of his speech centers, and yet at the same time is perfectly conscious of his infirmity.

*Aphonia:* This is the term used to signify a more or less complete loss of voice. It is distinct from mutism, for in most cases the voice is not entirely lost. Aphonia may result from paralysis of the respiratory muscles, or it may be caused by diseases of the larynx, such as chronic laryngitis, edema of the glottis, polypus, etc., or by pressure on the larynx caused by abscesses, vegetations and any kind of morbid growth; or it may be traced to some functional or organic disturbance of the vocal cords. A wound or contusion of the pneumogastric nerve will cause aphonia, or in other words, extreme hoarseness from paralysis of the laryngeal muscle on one side. Aphonia is very commonly associated with hysteria.

*Stuttering and Stammering.* As far back as 1830, Shulthess recognized and differentiated between the terms stuttering and stammering by the adoption of *stotern* and *stammeln*, which are still used in Germany. In England and America the terms stuttering and stammering are used synonymously, with the result that a confusion exists as to the two conditions designated by these terms.

By *stuttering* we shall understand *difficult* or *stumbling* or *hesitating speech*; by *stammering*, which we shall call *lisp*ing, *incorrect speech* or *mispronunciation*.

Stuttering may be called a temporarily appearing inability to begin the pronunciation of any word or syllable. The capacity of the stut-terer to speak seems to be related to certain mental attitudes or states of mind. It is this characteristic that gives the subject its psychological interest. The evidence for diagnosing this primarily mental defect seems to be accumulating. Fletcher has summarized the progress of this development somewhat as follows: "It was formerly thought to be due to permanent anatomical anomalies which were amenable to surgical treatment. Wedge-shaped portions were cut from the back of the tongue; the hypoglossal nerve, the lingual frenum, and the various extrinsic and intrinsic muscles of the tongue were cut; the tongue was pierced with needles; cauteries, blisters and embrocations of petroleum, also inoculations of croton oil were administered; tincture of rectified alcohol, peppermint oil and chloroform were applied. Wooden wedges were placed between the teeth; smoking was recommended as a sedative to the vocal cords and various other remedies were devised on the assumption that the difficulty was organic and peripheral." Much literature must have been spread broadcast upon these topics, for even now after years of riper thought and investigation, we are often asked by the despairing parents of the desperate young man if an operation cannot be performed immediately, when it has already been made quite clear that only long and arduous attention must be paid to the various exercises that we will later describe to you. The primitive theories gave place to the contention that, although the defect is not caused by gross anomalies, yet a permanent impairment of the nervous system is present.

*Lisping.* Lisping is mispronunciation. The lisper, unlike the stut-terer, can always speak; but his speech is incorrect. This type of defect is found in two forms, namely: (1) anatomical, and (2) developmental. The anatomical stammer is due to a malformation of one or more organs of articulation, as the lips, tongue, teeth, hard or soft palate, the nasal or pharyngeal cavities, etc. The developmental stammer has no such physical cause, but is due to incorrect functioning of the organs of articulation resulting in certain cases from immaturity, as in the baby talk of normal children, in whom the condition is not regarded as pathological unless it is prolonged beyond the age of five or six years. This developmental stammer, which is characteristic of all children at an early age, arises from

incomplete conception of vocal sounds and of lack of co-ordination of the muscles of articulation.

*Cluttering.* Cluttering is characterized by great nervousness, that shows itself in excessive rapidity of speech with indistinct enunciation. When the patient starts to speak, he hastens recklessly through what he has to say. The nervous hurry of his mind makes him form and combine the sounds imperfectly. The breathing may become spasmodic and irregular. Cluttering is usually combined with stuttering, but it can be distinguished from it. In the one there is nervous haste, in the other there is nervous fear. The clutterer speaks better the more he thinks about his speech; the stutterer often thinks better the less he thinks about it. The clutterer shows negligence and lack of self-control; the stutterer cannot release himself from anxiously watching over his speech. There are very few cases of cluttering without stuttering and quite a few stutters are also clutterers.

*Negligent Speech.* The following quotation from Samuel Arthur King in his "Graduated Exercises in Articulation," is a very fitting definition for negligent speech: "The most superficial observer of our common speech cannot help but be impressed with the undue prevalence of slovenly articulation, not only on the part of the younger generation, but also among those who teach and speak publicly. The muscles of the tongue can be brought effectively under the will, as can the muscles of the fingers and the hands. The principal cause of faulty articulation is not due to any natural inability of the vocal organs, but to the early formation of wrong habits. Lipping and dropping the tongue, the confusion of aspirates with vocals, the total lack of vibration in the vocal consonants, the omissions of consonants, final and otherwise, the ugly projection of the lips in *sh*, and of the tongue in *th*, the laxity of *f* and *v*, the flatness of *w*, the excess of aspiration in *t*, *p* or *k*—all very common faults in every-day speech—should be remedied effectually under a teacher's competent direction."

*Nasality.* The only pure nasal sounds in English are *m*, *n* and *ng*, in forming which the breath issues entirely by the nostrils. The soft palate is depressed sufficiently to uncover the inner nasal openings and divide the stream of voice into a nasal and an oral current. The former escapes freely, the latter is stopped by the conjoined lips for *m*, by the forepart of the tongue applied to the hard palate behind the upper teeth for *n*, and by the root of the tongue and hard palate for *ng*. The English *ng* brings the tongue and the soft palate in contact and consequently prevents the issue of breath by the



mouth. *Ng* has, therefore, always a uniform sound; it is incapable of change of quality. A partial nasality of vowels is one of the most prevailing forms of American dialects. Very few trans-Atlantic speakers are free from this habit, especially when the vowels precede or follow *m*, *n* and *ng*. The influence of imitation, and the almost universality of the custom, render the correction of this defect and even its recognition as a characteristic peculiarly difficult. Nasality, however, is a mistaken term, for the focusing of a tone is a matter of resonance and perhaps the most important element in this is nasal resonance.

*Mutism.* Inability to speak is usually the result of either congenital or acquired deafness. These patients are mute because they have never been taught speech and not because of any defect in the speech mechanism. The functional ability to speak is there. Congenital deafness is attributed mainly to heredity and consanguinity, also to alcoholism, syphilis, difference in the ages of the parents and to diseases of pregnancy. Acquired deafness is usually a result of meningitis, typhoid fever, scarlet fever and such diseases as measles, diphtheria, mumps, influenza, etc. The one thing of importance is to teach these afflicted ones to speak. Mental awakening is the first step in the training, for the mind of the mute is often in a backward condition because he can only poorly adjust himself to his surroundings.

*Uvula disturbances* are sometimes causes of speech defects. The uvula is subject to relaxation and elongation; in its relaxed position it hangs downward toward the larynx, where by its irritation it often gives rise to a constant tickling cough. If astringents fail to relieve this condition it may be concluded that the uvula is too long and a part of it should be amputated.

*Cleft-palate and Harelip.* As the upper lip may be fissured through imperfect development (harelip), so also may there be more or less decided fissure of the palate. In the slightest form of this deformity the uvula merely is fissured; while in extreme cases the cleft extends through both the soft and hard palates as far forward as the lips and is often combined with harelip. When this latter condition exists it materially interferes with the acts of sucking and swallowing, and articulation is painfully indistinct. When these defects can be remedied by the surgeon, by all means resort to an operation. But in many cases there is a lack of tissue, which means that when operated upon a shortening of the uvula and a stretching of the soft palate results, which does not improve speech. Dr. Vethake E. Mitchell, of New York, has presented in an article



entitled, "Artificial Restoration of Lost or Missing Tissues in Congenital Cleft Palate or Other Deformities of the Mouth,"† illustrations and descriptions of appliances that are calculated to restore all missing tissues and their functions. While lost parts are restored to a nearly normal condition by these appliances, speech is not immediately restored. Patient and persistent co-operation of the patient with a competent teacher of articulation is necessary in order to bring about satisfactory speech results.\*

*Chronic enlargement of the tonsils:* This is very frequent in children and in adolescents. In children the usual symptoms are muffled speech, obstruction in breathing and disposition to acute attacks of tonsilitis. Deafness occasionally is present both in children and in adults from the pressure of the enlarged tonsils upon the opening of the Eustachian tubes. Chronically hypertrophied tonsils should be removed with adenoid vegetation, which usually co-exist, but the decision to remove them must be made by a competent laryngologist and not hastily jumped at by an amateur.

*Classification of the Causes of Speech Defects.* 1. Physical; 2. Mental; 3. Moral; 4. Environmental; 5. Hereditary; or 1. Physical; 2. Psychic.

Foremost among the physical causes for defective speech is a poorly developed sense of hearing. It is well known that a child who does not hear will not, of its own accord, learn to speak.

Speech is essentially a matter of imitation. If one hears poorly or incorrectly he will naturally speak poorly or incorrectly. That this is so is shown by the fact that certain persons of defective speech need no other correction than to be placed near the person speaking, or an instrument by which the sound is intensified.

This deafness may be caused by a congenital defect in the structure of the ear and in such cases an operation will sometimes be helpful. Partial and sometimes complete deafness has been caused by adenoids, swollen tonsils, abscesses and other obstructions in the air passages. Removal of the obstruction, if it is really an obstruction, will nearly always improve the hearing and, through it, speech. There is, however, too much haste on the part of some physicians and nurses in condemning the tonsils, which they hold responsible for defects with which they are not connected. Too many unnecessary operations upon these maligned organs are daily performed and many nervous shocks are due to them. Unless the tonsils are diseased it is not necessary to remove them.

\*A Case of Re-educating Speech After a Cleft Palate Operation. Mrs. May Kirk Scripture, "American Medicine," February, 1916.

† "American Jour. Surg.," March, 1917, and "Dental Cosmos," Feb. 1917.

Quite frequently the trouble lies in the tongue itself. Many children are born tongue-tied, but a slight incision by an expert will remedy this. Occasionally we come across people whose tongue muscles are under-developed through lack of exercise, or some who have not sufficient control of their lingual muscles. The *conscientious* application of tongue gymnastics will do much in effecting a cure.

Another prolific cause of indistinctness and incorrectness of speech is rigidity of the jaws. There are cases in which the jaws have been so rigid that it was painful to open the mouth beyond the extent ordinarily required for mastication. This leads to what is known as mouthing of words. The voice does not carry and the speech is scarcely understandable. Frequent practice in relaxed jaw movements will eventually eradicate this condition. There are also some whose mouths are undersized. This prevents the mouth from performing its proper function in the regulation of the overflow of the breath. In cases of this kind the remedy lies beyond the reach of the teacher, but even then muscle exercises are most helpful.

Congenital malformation, such as high-arched palate and overlapping jaws and irregularities in the teeth may be greatly helped by orthodontia and in diagnosing cases of speech defects this important fact should not be overlooked. Orthodontia, or the art of regulating or correcting malpositions of the teeth, has developed into a distinct specialty of dentistry, to which many dentists devote their whole attention, and the results obtained by those who have the necessary mechanical ingenuity and ability are extremely gratifying. It is unfortunate that such special treatment for irregularities of this sort is so expensive, for many clinical cases of lisping might be materially helped by the orthodontist if the children of the poor could go to him.

An investigation by the health authorities of New York City recently revealed the fact that seventy per cent of the city's school children had very poor teeth—decayed, missing or malformed. Think what that means, considering the child's speech alone! In nearly all of these cases the timely formation of the habit of using a tooth-brush would have avoided such trouble. The teeth constitute an important organ of speech. Without teeth it is impossible to enunciate distinctly the dentals and sibilants, or to control the flow of breath properly. We are all aware of the indistinctness of speech which characterizes the conversation of an elderly person who has lost most of his teeth.

Congenital cleft-palate and other deformities of the mouth may be corrected either surgically or mechanically. The health and comfort of the cleft-palate and harelip patient is to-day being brought about by the surgeon and the dentist and consequently it is possible to improve both the voice and speech. When there is a lack of tissue, necessarily a shortening of the uvula and a stretching of the soft palate results from an operation which does not permit of an improvement in speech. In such cases a prosthetic restoration of the tissue undoubtedly gives better results. Such artificial restoration of lost or missing tissues is well described in a paper read by Dr. Vethake E. Mitchel, before the Dental Association of Pennsylvania in May, 1916, and published in the *Dental Cosmos*, February, 1917.

Hemiatrophy of the tongue,\* from whatever cause (bulbar palsy, anterior poliomyelitis, encephalitis, etc.), is another cause of defective speech. Weakness of the muscles of the tongue produces indistinctness and inability to pronounce certain letters, especially those requiring the use of the top of the tongue. The movements of the tongue are clumsy and the soft palate does not perform its proper functions. There is often an accompanying weakness of the lips which does not permit whistling. This cause of speech impediment is often overlooked and the patient is considered dull and even lacking in intelligence because no apparent reason for such negligent speech is evident.

Nervousness is a great cause of speech troubles. The stuttering so often encountered is frequently no more than the symptoms of a generally poor state of the nervous system. Sometimes it manifests itself as the result of some shock; not infrequently it is the after-effect of some illness; occasionally malnutrition, overwork, lack of sleep, and too rapid growth are the roots of the trouble. In such cases the nerve specialist must be consulted along with the speech specialist in order to give the necessary tonic that will brace the system to adjust itself to the work of the corrective exercises for speech.

The congenitally deaf who learn to speak orally do not develop the disorder of speech defects known as stuttering or stammering, because they are dependent upon the visual or kinesthetic areas for their speech cues. Moreover, the congenitally deaf who learn to speak orally are usually under no special speech strain, and, as pointed out by Gutzmann, they learn to speak while they are learning to

\*Hemiatrophy of the Tongue With Defective Speech. E. W. Scripture, Ph.D., M.D., *The Journal of the American Medical Association*, January 13, 1912.

understand speech. They have, therefore, comparatively little to say, and they are specifically taught how to say it.

According to Dr. Hudson Makuen, no less than 97 per cent of the stutterers that came to him complained of some nose or throat trouble and so great was it in 36 per cent of them that operations were performed for their relief. Over 37 per cent had intranasal pressure, due to various irregularities of the nasal septum, and about 11 per cent of them underwent operations. We can corroborate this statement by our own observations at the Vanderbilt Clinic, where we meet so many cases of deflected septums, diseased tonsils, and adenoids, and recommend operations, if we are quite sure that the organs are diseased, before beginning corrective exercises for the specific speech defects.

Indeed we could multiply indefinitely the physical causes of poor speech. It might, with some truth, be said that we speak with our whole bodies and that trouble with any part of them has some effect on the speech. This may be seen the better when we realize that gesture was the means of intercommunication of ideas long before oral language was developed. Gesture by all parts of the body is the most universal language to-day. The Englishman does not understand the German's verbal threat, but he will not fail to understand his shaken fist. The Frenchman and the Spaniard use their hands while speaking almost as much as they do their tongues. It is not a mere joke when it is said that if you tie a Frenchman's hands he cannot speak.

Of late years there has been propounded the theory of the localization of brain function. In fact, it has now progressed beyond the state of a theory for it is a scientifically proved fact. According to this theory certain bodily functions are controlled by definite parts of the brain. Broca's convolution is the name given to that part of the brain which controls the organs of speech. This brain center is present only in human beings. Post-mortem examinations have revealed the following facts:

1. That this brain center is very poorly developed in people who have been deaf mutes since early childhood.
2. That it is better developed in people who have suffered loss of speech later in life.
3. That it is well developed in those who have never suffered loss of speech.

Now, it stands to reason that, if there is anything the matter with this brain center, there will be something the matter with speech. Cases have been recorded where there was no apparent reason for a

person's inability to speak, but by means of a surgeon's knife operations on the brain have been performed which have removed the cause of this inability.

Mott\* says that neither vocalization nor articulation are essentially human. Many of the lower animals, e. g., the parrot, possess the power of articulate speech, and birds can be taught to pipe tunes. The essential difference between the articulate speech of the parrot and the human being is that the parrot merely imitates the sounds; it does not employ these articulate sounds to express judgments. Likewise there are imbecile human beings who, parrot-like, repeat phrases which are meaningless. Articulate speech, even when employed by a savage, always expresses a judgment. Even the common psychic process of recalling the name aroused by the sight of a common object in daily use, and in affixing the verbal sign to that object, is the expression of a judgment. But that judgment is based upon innumerable experiences primarily acquired through our special senses, whereby we have obtained a knowledge of the properties and uses of the object. This statement implies that the whole brain is consciously and unconsciously in action. There is, however, a concentration of psychic action in these portions of the brain which are essential for articulate speech; consequently, the word as it is mentally heard, mentally seen and mentally felt (by the movements of the jaw, tongue, lips and soft palate), occupies the field of clear consciousness; but the concept is also the nucleus of an immense constellation of subconscious psychic processes with which it has been associated by experiences in the past. In language, articulate sounds are generally employed as objective signs attached to objects with which they have no natural tie.

In considering the relation of the brain to the voice we have then not only a physiological, but a psychological problem to deal with. Since language is essentially a human attribute, we can only study the relation of the brain to speech by observations on human beings who during life have suffered from various speech disorders and then correlate these defects with anatomical changes found in the brain after death.

Between the vocal instrument of the primitive savage and that of the most cultured singer or orator there is little or no discoverable difference; neither by careful naked eye examination of the brain, nor aided by the highest powers of the microscope, are we able to discover any sufficient structural difference to account for the great

\*F. W. Mott. "The Brain and the Voice in Speech and Song." Harper & Brother, London, New York.

difference in the power or performance of the vocal instrument of the one as compared to that of the other; nor is there any discoverable difference in size or minute structure of the brain to account for the vast store of intellectual experience and knowledge of the one as compared with the other. The cultured being descended from cultured beings inherits tendencies whereby particular modes of motion or vibration which have been experienced by ancestors are more readily aroused in the central nervous system when similar stimuli producing similar modes of motion affect the sense organs. But suppose there were an island inhabited only by deaf-mutes, upon which a ship was wrecked, and the sole survivors of the wreck were infants who had never used the voice except for crying; would these infants acquire articulate speech and musical vocalization? I should answer, No. They would only be able to imitate the deaf-mutes in their gesture language and possibly the musical sounds of birds; for the language a child learns is that which it hears. They might, however, develop a simple natural language to express their emotions by vocal sounds.

The child of English-speaking parents would be able not to utter spontaneously English words, if born in a foreign country and left soon after birth among people who could not speak a word of English, although it would possess a potential facility to speak the language of its ancestors and race.

Gall, the founder of the doctrine of phrenology, wrecked his fame as a scientist by associating mental faculties with conditions of the skull instead of conditions of the brain. He was, however, the first to point out that that part of the brain with which psychic processes are connected must be the cerebral hemispheres. Gall surmised that the faculty of language lay in the frontal lobes, and Bouillard supported Gall's proposition by citing cases in which speech had been affected during life, and in which after death the frontal lobes were found to be damaged by disease. Concerning these theories many controversies ensued in France, and the French Academy in 1808, after a commission of inquiry, declared Gall's doctrine erroneous. His doctrine of phrenology was shown to be illogical; consequently it was forgotten that he was a pioneer of cerebral localization.

The next step in this line was made by a French physician, Marc Dax, who first observed that a disease of the left half of the cerebrum, producing paralysis of the right half of the body (right hemiplegia), was associated with loss of articulate speech. This observation led to the establishment of the most important fact in con-

nection with speech, *viz.*, that right-handed people use their left cerebral hemisphere as the executive portion of the brain in speech. Subsequently it was shown that when left-handed people were paralyzed on the left side by disease of the right hemisphere, they lost their power of speech. But the great majority of people are born right-handed, consequently in the great majority the left hemisphere is the leading hemisphere; and since probably specialization of function of the right (dexterity) limbs has been so closely associated with that other instrument of the mind, the vocal instrument of articulate speech, the two have now become inseparable.

It is impossible to tell just what has determined the predominance of the left hemisphere in speech. There is no adequate anatomical explanation. It can only be said that in the long procession of ages, evolution has determined right-handed specialization as being more advantageous to the progress of mankind than ambidexterity. And in this way right-handedness has become an inherited characteristic in the same sense as the potential power of speech.

Left-handedness in a child is then one of the etiological factors to be dealt with.\* If born left-handed, the child uses the right hemisphere speech centers, and if allowed to continue the use of this hand he will have no disturbance in the hemispheres; but if constant nagging and correcting and insistence upon the use of the right hand is long continued, a speech disturbance may be produced with those children who are so predisposed.

It was in 1863 that Broca showed the importance, in all right-handed persons (that is, about 95 per cent of all human beings) of the third left frontal convolution of the brain for speech. When this is destroyed by disease, although one can understand what is said, and can understand written and printed language, the power of articulate speech is lost.

Lesions injuring any part of the area of the left hemisphere of the speech zone cause speech defects. All neurologists admit this, but there is still a question under discussion whether the destruction of certain limited regions of the superficial gray matter is the cause of different speech defects or whether they are due to the destruction of subcortical systems of fibers, which lies beneath this cortical speech zone.

*Dyslalia*, or stuttering, is only one of the many speech defects, but *pseudolalia* and *alalia* will be left at the door of medicine and

\*Left-Handedness as an Etiological Factor in Speech Defects. Mrs. May K. Scripture, Dr. Otto Glogau, A. H. DeBra. *The Laryngoscope*, February, 1917.



we shall concern ourselves with the theory and practice of those defects that come to the teacher for help.

*Mental and moral, or psychic causes of speech defects.* Perhaps 90 per cent of the ills we suffer are due to carelessness. While this statement is not equally true in regard to speech defects, it is nevertheless a fact that a large number of cases of defective speech could be avoided entirely if proper care were exercised. We Americans are justly liable to criticism on account of our wastefulness and carelessness. Let us be more specific in this matter. How often have you heard a peddler loudly announcing his wares, in a language entirely his own? Listen closely to the speech of the newsboy. Unless you are entirely familiar with the names of the papers he sells, you will not understand him. We have ridden on the subway and elevated roads of this city countless times; we are familiar with all the various parts of our own city, yet the announcements of the conductors are so unintelligible that we have to rely on the printed signs in order to be sure of our whereabouts. If we need further to add to the above we trust that no offense will be taken if we refer to the slipshod, careless speech that is overheard among teachers. Remember that children imitate their elders in carelessness of speech as in other things.

Whenever we hear a mother say "Does oo love oor mama?" to her child our hearts beat with sympathy for the child and indignation at the mother. Babies will use some baby talk, because that is the best they can do with the undeveloped organs of speech, but children will continue to talk like babies because their elders do likewise. Soon the habit becomes fixed, and it is not long before the organs of speech have become adjusted to this baby language, and arduous labor is required to overcome it. It is well to add that the baby understand plain English, at least as well as he does the language that is supposed to be his own.

A few days ago a child of ten years of age, who stuttered most pitifully, was brought to the clinic. He was an anemic little fellow and was afflicted with chorea. His mother told us, among other things, that she had scolded and whipped him repeatedly and it did not cure his speech; the father had done likewise, so that the boy had really now become afraid of everyone he met. He didn't even look up when spoken to. Our hearts bled for the poor little fellow, for we understood his predicament. However, he gradually came to feel that we were his friends and it was not long before he lost most of his fear of us and in our presence his stuttering soon vanished. Fear was the only cause of his trouble. If his parents will

only change their tactics toward him, without a doubt he will be cured of his speech defect for all time. Thus it is seen that at home the stutterer is misunderstood and tortured, although many times the misunderstanding arises from over-anxiety on the part of the family to help. He is frequently reprov'd or scolded as an inattentive and bad boy because "he could speak properly if he tried." It is unfortunate that some of the parents who bring their children to the clinics are not the patients themselves, for they themselves require much discipline.

Right here a word of caution may be given. There are too many teachers who seek to rule their classrooms by fear. They constantly try to crush the spirits of the little ones by means of loud, shrill tones. To be perfectly candid, we should ourselves be brought to a state of nervous exhaustion if compelled to sit daily for hours and listen to some voices heard in classrooms, often, to be sure, the result of weariness and overwork. Concerning the production and use of the voice we shall speak more at length at some future time.

Of course we all know, but do not always remember, that children's minds are more active than is usually realized. Thoughts come rushing to them continuously, but unfortunately their command of language does not keep pace with the development of their thinking powers. Let us ponder for a moment upon the consequences of this condition. What happens to you when you have a thought which you desire to express, but cannot find the exact words in which to clothe it? You hesitate, you become impatient, you use a number of meaningless interjections and sometimes you even stutter. Now, consider the children, in whom the disparity between thought processes and expression is even greater than it is with you. There you have a prolific cause of stuttering, especially with children who are predisposed to nervousness. When a stutterer wishes to speak, the thought of his previous failures occurs to him and he fears or knows that he will appear ridiculous to those before whom he is speaking. This element disturbs his mental condition. He is seized with a violent emotion, that may be described as stage fright before a single person. Embarrassment, shame, fear, etc., express themselves in his face and often disturb his mental actions, so that he cannot think clearly. The emotion may make him absolutely speechless, as in the case of many people who cannot say a word when introduced to strangers. Or it may make him stumble over his words. Naturally he stumbles in the way he is forced to by the physiological mechanism of speech, namely, with stuttering cramps.

This disturbance of mental action during the fright stage may

produce a kind of intellectual paralysis. One patient, for instance, was often unable to answer a question, not, as he said, because he was afraid of stuttering, but because the requirement of answering actually produced such mental confusion that he could not think of the answer. This habit had become so thoroughly formed in another patient that any excitement whatever might render him unable to think. One stutterer explained this mental paralysis when asked to give his name or any exact information, as resulting from the fact that he is overwhelmed by having someone depend upon him for information that he alone can give. Another stage occurs not infrequently where the stutterer is no longer embarrassed by his defect; it is of course obnoxious to him and he would like to be rid of it, but the fright stage has disappeared.

In many cases defective speech seems to be associated with a peculiarity of character. This cannot be attributed entirely to the presence of the defect. In one case in our experience the child had previously developed a condition of nervousness which had become very extreme on account of lack of training in self-control. The stuttering habit, engrafted on this, became very violent. In another case the stuttering was associated with slowness of thought. On the other hand, stuttering may be caused by a multiplicity of thought. The cause at once suggests the remedy. When young children hesitate from inadequacy of verbal power, stop them at once. Tell them to think what they are going to say before they say it. Insist that they say it slowly and with continuity. In reading, insist that the child read the sentence or paragraph to himself before reading it aloud. If he stumbles, stop him and make him begin again and see that he knows every word before he reads it aloud.

Children are infinitely more emotional than adults. It has been said that the progress from birth to old age is marked by a constant diminution of the emotional powers. When you are under the influence of your emotions your speech is affected. For instance, how well known are the expressions *dumbfounded* with surprise, *inexpressibly* delighted, *speechless* with grief. Multiply a hundredfold the influence of the emotions on *your* speech and you will approximate the influence of the emotions on the speech of children. Conditions which do not arouse *your* emotions in the least will stir those of a child to the *utmost*. It is not unlikely that in a good many cases of defective speech, we must seek a cure in the proper training of the emotions—self-control.

The disparity between expressive and thinking powers as a cause of defective speech has already been mentioned. It sometimes

happens that after some hesitancy the expression for a thought suddenly comes to the mind. We say a word or two slowly, and in our anxiety to finish, we speak the rest of the sentence in great haste. This happens occasionally with adults, but frequently with children, and becomes an habitual mode of expression. No doubt in classrooms teachers have asked children questions which they answer poorly, through unreadiness of knowledge; thoughts do not come to them at once, they answer with hesitancy, their speech is choppy and disconnected. The glance of displeasure which the teacher gives them intensifies these characteristics and before long the children acquire the habit of speaking in this manner thus also producing incorrect breathing habits.

It might seem strange that there is a moral basis for defects of speech. We do not mean that immoral persons are always defective of speech, but we do mean that a person's defect of speech may sometimes be caused by a deviation from the norm of morality. Have you ever tried to tell a deliberate falsehood? Were you ever confronted by a situation in which you wanted to find an excuse for something wrong that you had done? Unless you had rehearsed your statement beforehand, how did you speak? Now consider the child who is constantly doing the things he is forbidden to do. Think of the imagination which makes the most impossible situations seem true to him. He knows that he is going to be cross-examined and he realizes that he is likely to be judged as unworthy. He is anxious to remain in your favor, so naturally his speech will be affected.

It is well known that at the age of adolescence profound changes take place in the child. Sex-consciousness comes into existence. Social practice has tabooed all discussion of this question of adolescence and the result is that the child is bound to maintain silence on all things sexual. Soon he (not infrequently she) indulges in practices which are of untold injury to the nervous system and stuttering is very often the result. The periods at which stuttering most frequently takes place are at the beginning of school life (fear) and at the adolescent age (sex consciousness); at these periods many children that have not before stuttered acquire the habit.

Many people stutter as a result of their desire to avoid controversy. They are vacillating in their speech and this habit soon extends itself to discourse which is not controversial. In such cases great care must be exercised in training the character while attempting to correct the speech defect.

Fear is probably the most dominant characteristic of the person afflicted with a speech defect. The fear of the patient usually originates in his embarrassment at not being able to talk and one who has not experienced the chagrin attendant upon the inability to perform this apparently simple psycho-physical act, can scarcely realize its full significance. Some claim that fear is the sole cause of stuttering and that the affection should be classed with the phobias; others, however, claim that fear is largely the result of stuttering and it may afterward become, in some cases, a secondary causal factor, as it is certainly one of its severest complications. This subject of fear is opening up a large field for investigation and it is hoped that in the near future we may be able to add some value material upon its solution from our experimental laboratory.

As we have seen anatomically and physiologically, the central speech mechanisms are closely related to the higher intellectual centers of the brain, and that they are under their direct supervision and influence, but not entirely under their volitional control. Willingness to speak merely sets into operation other complicated cerebral processes, which finally lead up to the fact itself, and any weakness in the chain of cerebral processes employed in speaking may result in some one of the various forms of defective speech. Scientific training tends to bring the processes of speech more and more under control of the will and, therefore, it should be employed as a prophylactic measure in those children showing a tendency toward faulty speech development; always remembering that in the affection under consideration, more than in most others, an ounce of prevention is worth more than the proverbial pound of cure.

Although the defects of speech are characterized by the motor manifestations—breathing, vocalization and articulation—there are many other conditions of body and mind concerned; and other muscles are involved, disturbances of pulse rate, of blood distribution and of psychic variations. Feeling, in its wider sense, is the essential impelling force of speech; feelings that tend toward depression, such as fear, anxiety or dread, or shame or embarrassment inhibit speech. These states of feeling vary in degree from strong emotions to mere attitudes or moods. In addition to these feelings, defects of speech seem to be affected by the quality of mental imagery, by attention and association. Hence the study of speech defects becomes specifically a psychological problem.

*Environmental factors—The school and speech defects.* No extended scientific investigations have as yet been made, or at least

have not been published, on the connection between school life and the acquisition by children of habits of defective speech. There is a substantial agreement among those who have made observations on these matters. Our own records will reveal information of a suggestive character, but before they can carry with them the weight of scientific authority, we shall have to collect statistics for a number of years and take into account the various elements that enter into this complex problem.

One observation already noted is that there is a marked increase in the number of cases of speech defects, notably stuttering, shortly after the beginning of school life. Let us consider for a moment the conditions of school life and see if we cannot utilize what scientific knowledge we have in arriving at some commonsense conclusions. The school's function in speech improvement is a many-sided question. Conditions in schools are closely bound up with outside conditions. There is the closest possible relation between the hurried, nervous and harsh tones of the classroom and the same phenomena in the life about it. The increasing demand of the public for practical results, in a material sense, crowd in upon the teacher. The crowded classrooms with their mixture of races, the curriculum that demands so much ground to be covered and the atmosphere of constraint and haste develops in both teacher and pupil an attitude of tension and impatience that shows itself often in nervous tones of speech and often engenders defects. We need to let down, and to take the time to speak slowly and distinctly; thus giving the teacher an opportunity to give careful attention to not only her own speaking voice, for her tones give the atmosphere to the classroom more than any other single factor, but also to those of the pupils.

Up to the time that a child enters school, he usually enjoys absolute freedom of speech. Whatever comes to this mind he is at liberty to express. Not so in school. With the large classes and the rigid requirements of curriculum, such freedom is almost impossible. This condition persists during school life and becomes worse as the child advances, so that when he reaches college he finds that the teacher does all the talking and he has only to listen and write. There are some writers who say that the effort exercised to keep silent constitutes a valuable part of moral training. If that be so, how much greater would the moral value be of keeping one's eyes closed for the greater part of one's waking time? The plain, undeniable, vital fact is that self-expression is essential; repression is baneful—especially in the matter of speech. The speech organs need exercise and if they do not get their exercise they will fall

short in the performance of their functions. The answer will be made that children have opportunity to indulge their desire to speak after school hours. But we want to teach *correct* speech, which as a rule is not heard out of school. Let this, then, be the rule of conduct in classrooms: Plenty of oral work; no unnecessary repression.

School life has made a virtue of immobility, but the child's welfare requires movement. Activity is essential to growth. It requires an effort to sit still and when the child is prevented from moving about freely he is subjected to a severe nervous strain, which cannot but have a baneful effect on his speech. The nerve specialist will tell you that a few months in the country, with absolute freedom of bodily movement will help in the cure of stuttering caused by nervous derangement. Teachers argue that stutterers in their classes who spend their school vacation in the country are much improved when they return to school in the fall, but are as bad as ever a few weeks after the opening of school. This fact of relief from duty is so very noticeable in the speech of children who come to the clinic during the school vacation months for the school children who attend during the summer months improve rapidly and go back to their classes in the public schools in the fall quite ready to speak normally, as they have done most of the summer, but the nervous strain of repression and fear soon produces the abnormal speech again and it takes more speech training and the constant influence of speech work to keep the patient's speech under control.

Another pernicious habit, due to the school room, is the single word, short, choppy answer. It is not meant that the answers of pupils should invariably be in sentences, but they should generally not be in single words. The habit is easily carried from the classroom into every-day life. Elicit the information from the pupils in such a way as to favor fluency of speech.

The study of phonetics should be regarded as an invaluable asset. In every good system of teaching, reading must give prominence to this line of work. The improper teaching of phonetics, however, has had some harmful effects. The phonetic elements of speech are merely the result of scientific decomposition. The spoken word is an entity. It has been scientifically demonstrated that the spoken word is continuous, that it is something more than the composite of its phonetic elements. If the teaching of phonetics is not properly done, the phonic elements will be unduly emphasized and a stuttering, halting habit of speech will be acquired.



We have previously referred to the localization of brain function. The various brain centers attain their development at different times. If we require of a child that he perform acts beyond his capacities or that he exercise functions, the brain centers for which have not reached their proper state of maturity, his nervous system will suffer. It is right here, I think, that the pedagogy of the future will have a most valuable service to perform.

Let us for a moment see if we can find where our curriculum needs mending. We all know that children love story telling. We know, as a rule, that they find arithmetic and grammar irksome. We know also that a normal child who begins the study of arithmetic at the age of ten will know as much arithmetic at the end of four years as the normal child of fourteen, who began the study at the age of six. The chances are also that the child who began the study at the age of six will have acquired a distaste for the subject, that he will discontinue it as soon as he can. So it is with other subjects. These statements would not be so startling if they were not actually proved to be true. You might ask, "What has this to do with speech defects?" Our answer is that the prevailing curricula impose a severe nervous strain upon the child, and nervousness almost invariably shows its symptoms in one's speech.

A teacher of a primary class once said that at the beginning of a term she had one stutterer in a class of thirty-six pupils. At the end of a month two other pupils began to stutter. At the end of two months she had five stutterers. She became alarmed at the situation, but at the end of the third month the original stutterer moved to another district and thus was taken out of her class. At the end of the third month she had only three stutterers. Here we learn a valuable lesson. Children may acquire the habit of stuttering—as they do other habits—by imitation. Children who stutter should, as far as possible, be taught separately. They should also be kept from adults who stutter for, consciously or unconsciously, they will imitate.

*Speech defects as influenced by environment, heredity and the home.* Any attempt to enumerate fully the causes of speech defects would cover the whole range of human activity. We cannot, however, conscientiously leave the subject of the etiology of speech defects without a casual reference to the effects of heredity, environment and the home.

The story of the Tower of Babel might contain some moral teaching, but it cannot explain to our satisfaction the multiplicity of the language systems in the world. We must look deeply into

the science of anthropology, ethnology and other ologies to find an adequate explanation of the varieties of speech. No doubt science will some day satisfactorily account for the amount of influence each of the various factors has had in the formation of languages. However, this fact is undeniable: environment plays a not inconsiderable part in the acquisition of the habits of defective speech. You are all acquainted with the nasal twang of the Yankee, the drawl of the Southerner, the misplaced *h* of the Cockney, the thick brogue of the Irishman, and the nondescript jargon of the New Yorker. In so small a country as England you will encounter not less than half a dozen marked variations of speech. In fact, some of them are unintelligible to most people. The speech of the Lancashire laddie is almost a foreign language to the ordinary son of Cornwall, and the Northumbrian speaks an English which is foreign to both. Cultured Englishmen, of course, can understand one another regardless of their differences in birthplaces.

In nearly all of our cities there is a large foreign population. The tendency is for them to gather together according to their nationalities. Thus we have a Jewish section, an Italian section, a Chinatown, a Polish section, a Greek section, etc. This is a natural condition. When foreigners come to this country they want to live where they can be understood and where there will be the least need for the acquisition of new habits. The children of these immigrants spend their most impressionable years in an environment where English is a foreign language. There are sections of New York City where advertisements, public notices, political addresses, etc., are in foreign tongues. The school is almost the only place where English is heard and aside from an inadequate English vocabulary, each child will have defects of enunciation which are peculiar to his race. The Jewish child adopts the same intonation for the declarative sentence that he does for the question. The child of Italian parentage tends to talk English at a breakneck speed. He adds vowel-sounds where they don't belong and omits them when he ought to say them. These all constitute defects of speech.

Habits of incorrect speech are very contagious. Have you ever found yourself using some catchy slang or ungrammatical expression that you have heard at some vaudeville performance? How often are these attempts to be funny clothed in dialect or supposed dialect? They are sometimes pronounced abominably. You carry these expressions home. Others hear them and imitate them. Adults, perhaps, realize that they are incorrect, but children frequently do not. Try to think of the harmful effects of such care-

lessness. Notice the spelling of vernacular phrases put on the screen at moving picture shows and do not wonder at the wrong impression the foreign child picks up.

Some educators have said that education is the process of adjusting the individual to his environment. There is some truth in this statement; but it is also true that some part of the educative process must consist of counteracting the influence of environment. The ceaseless struggle for material advancement, the increasing perplexity of the problems of life, the unending conflict between what is natural and what is conventional—these and countless other things, exert a marked influence on speech. All these things take from the time and energy which might be devoted to the acquisition of correct habits of speech.

The effect of heredity on speech would be a fruitful source of investigation for the student of eugenics. Epileptics, the children of habitual drunkards, of insane people and of syphilitics, contribute more than their share to the defectives of speech.

From our long experience in the study of speech defects an undoubted observation is that an improvement in speech is nearly always accompanied by an improvement in general mentality. We devote our energies to that part of the curative process that builds character, thus strengthening the will to exert itself for speech improvement.

55 Central Park West.

---

**Congenital Absence of Lung.** A. G. ELLIS, *American Jour. Med. Sciences*, July, 1917.

Boy, eight years old. Cause of death was acute endocarditis, pericarditis and pleurisy with effusion following acute articular rheumatism. Autopsy revealed absence of left lung. The author has found eighteen other cases reported in the literature which together with his own case make nineteen cases of absence of one lung; thirteen were of the left and six of the right. Interference with blood supply in early embryonic life is supposed to be the cause in all cases.

Ed.

## A MECHANICAL SPOON FOR ESOPHAGOSCOPIC USE.

DR. CHEVALIER JACKSON, Philadelphia, Pa.

In endoscopic removal, friable substances and those with little cohesion such as meat, nut kernels and the like, and also substances too large to be grasped with forceps, are in some instances better

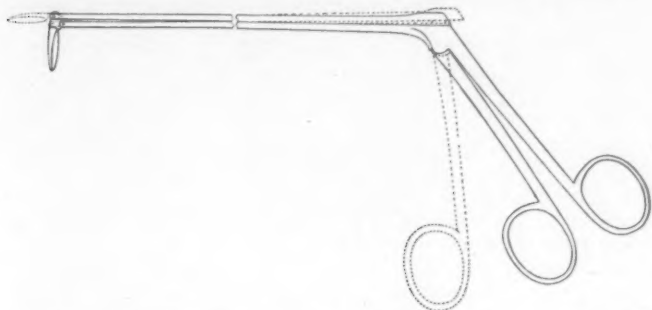


Fig. 1. Mechanical spoon for use in the upper third of the esophagus for the removal of foreign bodies to the removal of which forceps are not so well adapted.

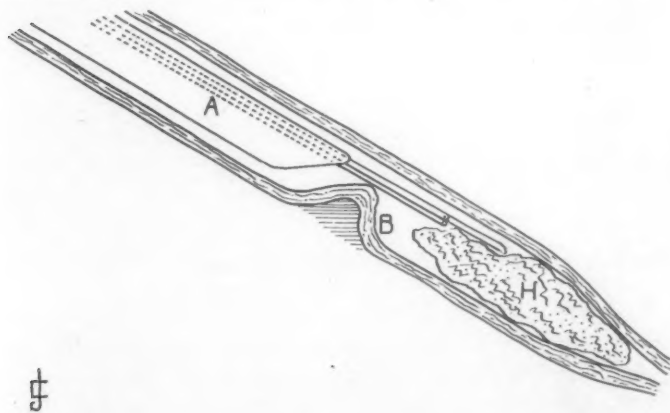


Fig. 2. Mechanical spoon being insinuated between the esophageal wall and the impacted foreign body, H, below the cricopharyngeal fold, B.

handled with a mechanical spoon, constructed on the principle of the author's safety-pin closer. This has so frequently proven satisfactory that the author has devised a larger, shorter, and heavier

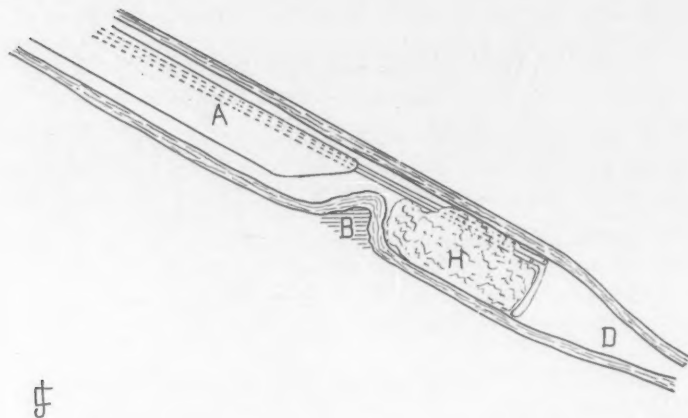


Fig. 3. The spoon has been turned down below the foreign body, H, which is being drawn upward.

model (Fig. 1) for use in the esophagus below the cricopharyngeal constriction, as shown schematically in Figs. 2 and 3. Large, impacted boluses of meat have in a number of instances been thus removed, and a peach stone which was too large to be grasped by forceps was removed in one instance.

**The Vaccine Treatment of Coryza.** H. LELAND FIFIELD, *Med. Record*, March, 10, 1917.

Attention is directed to the end-results of ordinary catarrhal inflammations of the nasal mucous membrane, especially when the attack is prolonged, and frequently repeated. In these cases the sinuses become involved and infection persists. The author has found autogenous vaccines to be very beneficial under such conditions, and better than stock vaccines.

Patients who suffer from obstruction of the nasal cavities must first have these lesions relieved, before the vaccine treatment is applied.

LEDERMAN.

### AN ESOPHAGOSCOPIC FORCEPS.

DR. CHEVALIER JACKSON, Philadelphia, Pa.

It quite often happens that coins, disks and other objects lodging as foreign bodies below the cricopharyngesis are tilted in such a way that an alligator forceps with the movable jaw opening downward instead of upward (Fig. 4) is very useful. As shown in Fig. 5

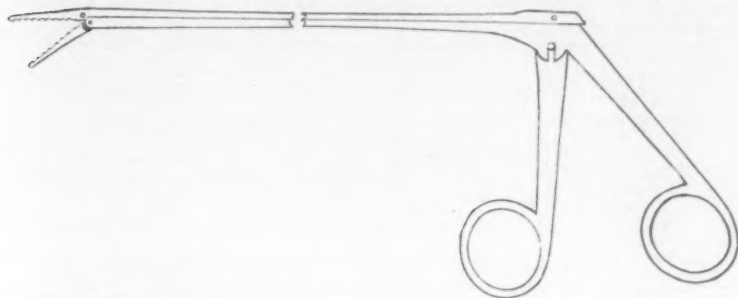
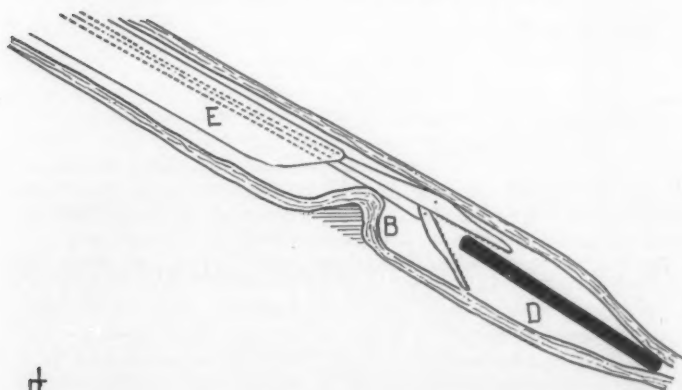


Fig. 4. Esophageal forceps with downward acting jaw.



†

Fig. 5. Schema illustrating the alligator forceps in use in removal of a coin from below the cricopharyngeal constriction.

the jaw is very useful to reach backward below the cricopharyngeal or any other fold. After becoming accustomed to it the downward-acting jaw seems preferable to the rising jaw.

### AN IMPROVED SNARE.

DR. CHARLES B. HARWOOD, Houston, Texas.

The snare has a short finger reach. It is light weight, yet strong enough for the heaviest kind of work.

The *eccentric wheel* "A," when lever "B" is turned down causes the spring catches "C," one on each side of lock, to fit into worms so firmly, that it is impossible for the snare to slip or strip the threads when the *ecraseur* is used.

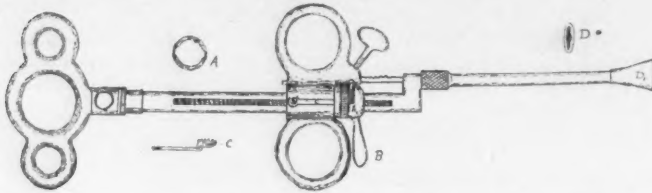


Fig. 1. A, cross-section of eccentric wheel; B, lever which turns wheel, locking and unlocking snare; C, spring catch; D, end view of cannula tip. Drawings are of exact size of snare.

The joint between the end of the snare and the of the *cannula* is morticed and held firm by a ferrule.

The stylet, or wire carrier, is extra heavy. Also the flared end of the cannula.

Both stylet and cannula are made especially for No. 9 wire.

### Preliminary Note on a New Treatment of Bronchial Asthma. A.G.

AULD, *British Med. Jour.*, May 5, 1917.

The method employed by the author is immunization by the subcutaneous injection of peptone. One-third of a gram of peptone (Witte or Armour) is dissolved in about 5 c. c. distilled water at blood heat and is injected at intervals of three or four days during the week. The next week two injections, each of two-thirds gram are similarly given and in the third week two injections of 1 gram in 7 to 10 c. c. water. Severe cases may require 1 gram weekly or biweekly for three weeks more. No apparent constitutional reaction follows and little or no local reaction.

Ed.



## SOCIETY PROCEEDINGS.

### AMERICAN LARYNGOLOGICAL, RHINOLOGICAL AND OTOLOGICAL SOCIETY,

*May 31 and June 1, 1917, Atlantic City, N. J.*

DR. THOMAS J. HARRIS, New York City,  
President, In the Chair.

#### **A Personal Study of the Pathological Processes Involving the Maxillary Antrum, With Special Reference to the Nitrate of Silver Treatment.**

—DR. JOSEPH A. ABRAHAM, New York City.

Upon the premise that the therapeutics of disease processes depends on their pathology and etiology, the writer gave the following schematic classification of diseases of the maxillary antrum, presenting cases and stereopticon pictures of the various types, and outlining the treatment, with especial reference to the use of silver nitrate:

(1) Inflammatory: (a) acute catarrhal and purulent. (b) chronic catarrhal and purulent (open, confined).

(2) Neoplastic (benign and malignant, traumatic, etc.).

Especial attention was given to catarrhal inflammations due to metabolic or systemic conditions, in which the mucous membrane might share in the elimination of irritative excretion, with a consequent change, usually of a catarrhal type. Operative interference predisposed individuals so affected to secondary infections. Hygienic and dietetic regime, with local and internal treatment, were recommended in all acute cases, catarrhal or purulent. In the exceptional cases of acute purulent inflammation which persisted, despite these measures, an antiseptic astringent solution for irrigation was indicated. After fifteen years of experimentation with various agents, he had found nitrate of silver, employed as in chronic empyema, the most satisfactory.

The silver nitrate treatment was given: In simple chronic empyema, after applying cocaine and adrenalin to the naso-antral wall, inferior turbinate, floor and adjacent surface of septum, the lower border of the inferior turbinate is resected, down to the bone, and, if necessary, a small portion of the lower border of the bone, is resected. The antrum is washed by means of the writer's needle and syringe. Then, through the inferior meatus, the antral mucosa is cocaineized. This opening is enlarged, granulations removed, and the antrum thoroughly douched, and the nasal vestibule plugged with cotton. On the following two or three days the antrum is irrigated with normal saline solution. The nitrate of silver treatment is begun about the third day. After careful preparation, (described in detail) the antrum is syringed with from two to five cubic centimeters of a weak solution of silver nitrate, usually one per cent. Day by day the strength of the silver nitrate solution is increased until the mucosa assumes a normal appearance. This requires from ten days to three weeks. The antrum is left perfectly normal, with a minimum destruction of the inferior turbinate and nasal mucosa. The action of

the silver salt on the nasal membranes relieves congestion, destroys infection, reduces hypertrophy, and cures the so-called "nasal catarrh."

In chronic empyema due to or complicated by root abscess, with necrosis, the tooth is extracted and the tooth socket curetted. The treatment is then the same as described.

In syphilis the treatment is local and general. Locally all that is necessary, when the gumma is broken down, is to secure thorough drainage, as described. Antisyphilitic treatment is administered, and necrotic bone removed.

#### DISCUSSION.

DR. ROSS HALL SKILLERN, Philadelphia, was impressed with the remarkable divergence of view obtaining at the present time with regard to the frequency of maxillary sinusitis of dental origin. Dr. Abrahams had given it as fifty per cent.; others had stated it as being all the way from two to one hundred per cent. In his own experience it was about twenty-five per cent.

It was to be recalled that mixillary sinusitis might very readily retrograde, and infect the roots of the teeth, so that it might be said that the sinus infected the teeth, rather than that the teeth infected the sinus.

He had had no experience with dietetics in the management of these cases. Irrigation was rather a trite proposition, inasmuch as it was the practice of the majority to make a needle puncture and to combine the needle puncture with therapeutic measures, continuing to irrigate, after making the puncture, beginning with normal salt solution, and working up to nitrate of silver. It had been shown that it was not futile to carry a patient over a number of weeks, finally getting a cure. A French writer had reported that only after fifty-three irrigations was he able to cure a maxillary sinusitis. Dr. Chamberlin had reported making twenty-three irrigations in one of his cases, the patient having refused operation.

Resection of the inferior turbinate, which Dr. Abraham had included as a part of his treatment, was not necessary. Many operators had given up the sacrifice of any tissue in the treatment of maxillary sinusitis, removal of the pre-maxilla being sufficient. An incision could be made in front of the inferior turbinate and the sinus inspected.

rveealu etaoin etaoin shrdlu shrdlu shrdlu shrdlu cmfwyp cmfw

DR. HARRIS P. MOSHER, Boston, Mass., was in accord with Dr. Skillern in the matter of treatment of diseases of the mixillary antrum. Opening the antrum, plus aeration, was sufficient, irrigation being necessary in only a small proportion of cases. He was greatly surprised to hear the essayist report seven hundred cases of disease of the mixillary antrum, even from a city like New York, and was rather inclined to think he had confused acute with chronic cases. Had he persisted in the treatment of acute cases he would probably have obtained just as good results as those reported in the paper. It was also surprising that in one or two acute cases Dr. Abraham had waited so long before washing out the antrum. It was not apparent why he had not put in the needle the first day instead of waiting for general medical treatment. It was equally difficult to understand why he waited until he had had the teeth X-rayed, why he did not have them X-rayed at the first examination, and why, in

some cases, he waited for the removal of the teeth. In the speaker's experience the removal of the teeth cleared out the antrum.

As to operative procedure, he had never had faith in or liking for the intranasal treatment of suppuration of the maxillary antrum. He had always felt that any intranasal operation gave nothing more than a peep-hole into the antrum. If a case did not clear up under irrigation within six weeks it had been his custom to employ the old-fashioned canine fossa operation, with a large opening into the nose. Having done this, he had never found it necessary to resort to any special form of irrigation.

DR. LEE M. HURD, New York, recalled a case in which there was involvement of the frontal sinuses, the ethmoids, and the maxillary antrum, with abscess of the orbit, in which the infection had extended through the roof of the antrum. He had never operated in an acute maxillary sinusitis. He had always used the needle early, washing out with normal saline solution, and, if one or two washings did not clear up the condition, had filled the antrum with bismuth paste, repeating this every other day. It was a painless procedure, and cleared up the cases promptly. Some of the patients had drifted away with the antrum filled with paste. He saw no reason whatever for opening the antrum through the canine fossa, as advocated by Dr. Mosher. He abandoned the method, except when doing a Killian operation upon the frontal sinus. Drainage was much more quickly accomplished through the inferior antral wall. In dental cases not only must the teeth be removed, but the bone must be curetted. It was possible, with nerve-blocking, to operate with perfect safety and comfort without the disadvantage of general anesthesia.

DR. J. W. JERVEY, Greenville, S. C., was glad to hear Dr. Myles emphasize the importance of getting down to something basic, and to hear Dr. Abraham refer to acute and chronic catarrhal inflammation, thus bringing before the Society the question of a definition of the term, *catarrhal inflammation*. It was as easy to talk about a catarrhal inflammation as about *rheumatism*, *heart failure*, *senile decay*, or any of the other vague terms in use. One knew that inflammation might be acute or chronic, passive or active, due to heat, chemical action, or vasomotor disturbance, or to some *vis a tergo*. In which category would one place catarrhal inflammation? Philologically speaking, perhaps, any inflammation of a mucous membrane might be spoken of as catarrhal, but that was a question. In the class of catarrhal inflammations, would Dr. Abraham make irrigations per *via naturalis*, or by puncture? The speaker would do neither.

DR. JOSEPH C. BECK, Chicago, had expected, from the title of the paper to see a demonstration of pathological specimens, and was disappointed to find in it no exposition of real work on the pathology of the maxillary antrum. He had especially anticipated seeing some histological specimens of syphilis of the sinus, inasmuch as Dr. Abraham had called his attention to the fact that he was the first to demonstrate syphilitic sinusitis. It was recalled that in a paper which the speaker had presented before one of the sections of the New York State meeting, reference was made to the rarity of this condition. Dr. Abraham had then given him a reprint dealing briefly with the subject. This contribution of Dr.

Abraham's was not indexed, which was unfortunate, as a question of this kind should be published at length. The importance of the teeth in relation to the diagnosis of disease of the maxillary antrum had been clearly demonstrated by Dr. Haskin. Bismuth paste was useful only in certain cases of chronic sinusitis. When the pathological process involved the mucous membrane there was nothing to be done except an obliteration operation.

Dr. Abraham, in closing the discussion, called attention to the fact that in the time allotted it was impossible to cover completely such a wide field, which perhaps accounted for some of the misunderstandings on the part of the speakers in the discussion. The relative frequency of dental cases, which he had given as fifty per cent., and which Dr. Skillern had found to be 25 per cent., was doubtless the outcome of a difference in experience. Dr. Mosher had expressed surprise at the number of cases reported; the number was placed at "several hundred," not "seven hundred," as Dr. Mosher had understood. As an illustration of the frequency with which these cases presented themselves in the speaker's experience, he recalled that during the last five days he had sent three cases of chronic empyema of the maxillary antrum to Dr. Caldwell for X-ray examination, the diagnosis being verified in each case. Another misconception was with reference to the technic. He did not remove the anterior end of the inferior turbinate, but merely dissected away the inferior border. When these cases healed they had perfectly normal mucous membrane. In acute cases he used mild solutions; and he had specifically stated that in some cases he employed no irrigation at all. His purpose always was to restore to the patient a normal antrum, which it was possible to do.

The teeth might become infected on the opposite side, the teeth on the same side as the antral infection not being involved. He agreed with Dr. Hurd with regard to the frontal sinus and ethmoid cells. The key to the entire situation was the question of drainage. Necrosis and granulations must be removed. The tendency of the opening to close, as suggested by Dr. Myles, would be largely obviated by making the opening as near to the floor as possible. He had no experience with bismuth paste, as suggested by Dr. Hurd, his experience with nitrate of silver having proved entirely satisfactory. The method, proposed by Dr. Myles, of opening through the hiatus semilunaris, did not always give satisfaction.

Answering Dr. Jervey, the question of classification had been thoroughly covered in the paper.

He expected, at a future time, to publish the pathological data, the lack of which in the present communication had disappointed Dr. Beck.

**Report of a Case of Co-Existent Carcinoma, Tuberculosis and Also Probably Syphilis of Esophagus.**— DR. LEE WALLACE DEAN, Iowa City, Iowa, and DR. J. B. GREGG. (By Invitation.)

After reviewing the literature of tuberculosis, carcinoma, and syphilis of the esophagus, occurring separately, in various combinations, and co-incidentally, the writers detailed the case of a man, sixty years of age, who sought relief in consequence of inability to swallow well, weakness, and cough. The present illness began twenty-eight years ago, when for

a period of five weeks he suffered from dysphagia, with no other noticeable symptoms. No further trouble was experienced until November, 1915, when one or more attacks of dysphagia, with cough, loss of flesh, weakness, et cetera, eventuated in examination and the diagnosis of tuberculosis involving both apices. Esophageal examination (X-ray) revealed an S-shaped stricture of the esophagus, the middle of the stricture being at about the union of the manubrio-clavicular articulation. It began, apparently, at the lower margin of the cricoid cartilage.

The patient was esophagotomized, under cocaine anesthesia, with the Mosher and Jackson esophagoscopes. A nodular mass was found on the right side of the esophagus, an inch and a half below the cricoid cartilage. Microscopic examination of a section removed gave the following: "Certain pieces of tissue consisted of the normal squamous epithelium lining of the esophagus. Others and more especially the largest piece consisted of connective tissue and non-striated muscle tissue invaded by a large number of solid masses of epithelial cells. These epithelial cells were of the squamous type. Many of the nests or masses of epithelial cells contained hornified epithelium in their centers, forming distinct whorls or pearls. The muscles or connective tissue invaded by the epithelial cell masses is markedly inflamed as shown by a large amount of round-cell infiltration; the 'round cells' of which are principally fibroblasts.

"Other pieces of tissue contained distinct tubercles consisting of central masses of beginning caseation necrosis surrounded by quite a large number of giant and endothelial cells, and about the periphery, large numbers of 'round-cells' consisting of fibroblasts and lymphocytes. The giant-cells were of the typical tubercle type; that is, the nuclei were arranged about the periphery of the cells whereas the center of the cells showed the homogeneous structure of caseation necrosis. In one field, fourteen giant cells were found. A few tubercle bacilli were also found."

The Wassermann blood test was positive. The tuberculin test (von Pirquet's) was positive. Tubercle bacilli were found in the sputum. Smears taken directly from the larynx were reported as negative for tubercle bacilli.

Mercury inunctions and potassium iodide treatment gave immediate improvement. In less than a month the patient was able to swallow all kinds of soft and semi-solid food.

Microscopical examination of the pieces removed from the esophageal tumor proved both its carcinomatous and tuberculous character. The marked improvement in the swallowing after antiluetic treatment alone, and the presence of a positive Wassermann, suggest a definite luetic element present in this mixed tumor. The difficulty in swallowing years ago, which lasted six weeks and then disappeared, also suggested syphilis.

#### DISCUSSION.

DR. SAMUEL IGLAUER, Cincinnati, Ohio, referred to the remarkable fact that the esophagus so often escaped tuberculosis, considering the amount of sputum swallowed by the patient. It was probably explained by the fact that the esophagus, like the mouth, owing to its peculiar epithelium, was not predisposed to tuberculosis. Another explanation might be found in the rapidity of deglutition. In investigating this question some time

ago he had found that food passed the larynx in 1-40th of a second. In the absence of abrasions the rapidity of deglutition shortening contact probably prevented infection. On the other hand, tuberculosis of the intestines was very common, probably due to the prolonged stay of tubercle bacilli in the intestinal tract.

It was very important, after removing impacted food, to look for some pathological lesion. He recalled a case, in a coal heaver, in whom food became impacted in the esophagus, a gumma being found upon removing the food. In another case the peribronchial glands were found to be involved, probably syphilitic.

Several cases of coexistent carcinoma, tuberculosis, and syphilis of the larynx had been reported. Carcinoma frequently supervened upon syphilitic ulcer, but it was very rare for carcinoma to supervene upon tuberculosis of mucous membrane or skin.

He suggested the use of the cautery in the treatment of tuberculosis lesions in the esophagus.

**The Use of the Aspiration or Vacuum Suction Apparatus in Cases Where the Ability to Swallow or Cough Has Been Partially or Completely Lost and the Patients are Practically Being Drowned in Their Own Secretions.**—DR. ROBERT C. MYLES, New York, City.

Three illustrative cases were cited: (1) Man, aged sixty-seven years; broncho-pneumonia; recovery. (2) Child, three years old; post-pharyngeal abscess; recovery. (3) Man, seventy-two years old; influenzal tracheo-bronchitis, with cerebral anemia, paralysis of every reflex and muscle in the body except the heart and diaphragm; recovery, followed by gradual failure and death. These cases suggested a broad field of usefulness for the suction apparatus in cases of coma, paralysis, and inability of self-removal of the secretions from the respiratory tract, from whatever cause. Five to twelve inches of pressure were found to be the best. The tubes, while in use, should be kept in a rapid vibratory motion, to prevent the in-drawing of the mucosa. It would be difficult for one to believe that a patient could recover from the condition in which the old man (case 3) was for over eight hours, unless one had been a witness to the experience. It was not quite clear as to what was the actual and exciting cause of the profound temporary paralytic coma, in this case. It would seem to simulate the condition brought about by hyperextensive action over the celliac axis.

DISCUSSION.

DR. THOMAS HUBBARD, Toledo, Ohio, had always been more or less skeptical about bronchial flooding until a recent experience had convinced him of its possibility. He had been called to see a child who had aspired a grain of corn. The corn completely plugged the right bronchus, where it had been for forty-eight hours. Following extraction the child was asphyxiated by the flood of mucous secretion released by the removal of the foreign body. The patient was held head down, and there was a gradual return of respiration. It was clearly an instance of the sudden flooding following the removal of a foreign body in the bronchus. Such a possibility should always be borne in mind in connection with these cases. He should have been forewarned in this case and prepared



to aspirate or to give oxygen, as the physical signs indicated complete plugging of one bronchus, the right. The absence of any respiratory sounds and dullness of the right side, without fever, pointed clearly to pent up bronchial secretions. Dr. Myles' method should be available for such cases.

DR. HARRIS P. MOSHER, Boston, Mass., said Dr. Jackson had brought before one of the societies, and had reinforced in his book the great advantage of direct bronchoscopy in the relief of bronchial flooding. In the second case cited by Dr. Myles, which was a typical case of retropharyngeal abscess, incision would have accomplished all that suction did. He felt that the vacuum suction apparatus would be of great value in cases of pneumonia in which the patients were drowning in their own secretions.

DR. GEORGE F. KEIFER, Lafayette, Ind., called attention to the use of the suction apparatus for the removal of secretions from the mouth in cases of children with stricture of the esophagus due to swallowed lye. Children, especially very young children, when the esophagus was dilated, developed enormous amounts of secretion under these circumstances, until they would become blue in the face, and it would be necessary to withdraw the dilator from the esophagus until the secretions were removed. With the use of the suction apparatus for withdrawing secretions from the mouth and trachea he had found it possible to dilate these strictures for a longer time than would otherwise be possible. He had used Dr. Beck's apparatus. Several years ago he had reported before this Society the treatment of severe cases of asthma by the introduction of the bronchoscope and the use of adrenalin-cocain solution applied locally to the bronchi. The secretion could be withdrawn by suction after the introduction of the adrenalin-cocain solution.

DR. JOSEPH C. BECK, Chicago, cited a case of very severe bronchorrhea, of several years' duration, in a woman who had been at an institution for the treatment of tuberculosis. The patient was unable to expectorate the large amount of secretion. He put her under suspension laryngoscopy, and every day for three weeks withdrew quantities of this secretion, with the result that she recovered, and regained thirty or forty pounds of weight. This was not tuberculosis, but merely bronchorrhea, probably secondary to nasal infection.

DR. WILLIAM H. HASKIN, New York City, recalled the fact that in 1909 or 1910 he had produced and had presented the vacuum apparatus and method of treatment, which was received as a joke at the time. He had repeatedly emphasized the usefulness of the method in many of these conditions. In cases of retropharyngeal abscess it had been his custom to attach a trocar to the vacuum cleaner, and remove the secretion, obviating the danger of any secretion getting into the trachea. It was very gratifying to see that the instrument makers were hardly able to supply the demand for the pumps since their value had become so fully recognized.

DR. THOMAS J. HARRIS, New York City, recalled the pioneer work of Dr. Haskin in the suction treatment of the various conditions under discussion. The method could properly be ascribed to Dr. Haskin.



**The Ocular Circulation as Affected by the Diseases of the Nasal Accessory Sinuses.**—DR. LEWIS A. COFFIN, New York City.

During the past decade much interest had centered about the question of the dependence of certain disease of the eye, the optic nerve and the neighboring tissues, upon the diseases of the nasal accessory sinuses, especially empyema of these cavities. While this dependence had been generally admitted, considerable diversity of opinion existed as to the explanation. The present investigation had been undertaken with the view of bringing about a better understanding of the matter from a study of the circulation of the nose, as well as that of the eye. The circulation of the nose and eye were most intimately associated, a large part of the blood supply to the nose being brought to that cavity by the ethmoidal branches of the ophthalmic artery and returned by the ethmoidal veins to the ophthalmic veins. This particular arrangement lent itself to the most frequent affections of the optic nerve and eye, viz., circulatory changes brought about largely by the inflammation of the veins due to the direct continuity of pyogenic tissue. Phlebitis, in the writer's opinion, found nowhere more suitable condition for its production than in these structures. In order to appreciate all the pathological changes that might take place in the eye from this relationship, one must understand the various phases of phlebitis. Having arrived at such an understanding, one should think of the various veins of the orbit and bulb; then picture to oneself the various effects of these various phases of phlebitis on the various veins. The list of diseases of the eye, then, would seem not sufficiently long.

For the purpose of obtaining a series of X-ray findings as to the accessory sinuses of children in health and disease, the writer had had made radiograms of the heads of children in the eye ward of the Manhattan Eye and Ear Hospital. Every child showed diseased sinuses, thus furnishing strong presumptive evidence of the interdependence of the diseases of the eye and the nasal accessory sinuses. Illustrative cases and stereopticon pictures were presented.

DISCUSSION.

DR. EDGAR S. THOMPSON, New York City, speaking from the ophthalmological point of view, said: "The influences of the sinuses upon the eye and orbital tissues occur in two main groups: intra-ocular, and orbital inflammations. Orbital inflammation, or orbital cellulitis, the vast majority of cases, is due to sinus infection, unless, of course, the infection comes through an external wound. In fact, when we consider the external protection afforded by the facial walls, it is difficult to explain idiopathic orbital cellulitis on other grounds. Infection from the antrum or frontal sinus manifests itself so far forward, and the symptoms are so characteristic, that it is not necessary to do more than mention them. The most common cause of orbital cellulitis is direct infection from the ethmoids. It is important to recognize this in its early stages. The symptoms are slight exophthalmos, pain on rotating the eye, and the usual accompaniment of slight rise in temperature.

The best means of determining the exophthalmos is through the exophthalmometer of Hertl, which is, no doubt, familiar to you all. The reading of this instrument can be considered from its absolute figures,

unless one eye shows a very much higher reading than the other, without a marked asymmetry of the face to account for it, but the comparative reading showing gradual protusion from day to day.

Inflammation of the ethmoid also frequently causes a low grade type of choroiditis, in the course of which numerous fine opacities are thrown out of the vitreous. I have repeatedly seen good results from opening the ethmoids in such cases.

Inflammation of the sphenoid most frequently causes inflammation of the optic nerve. This occurs at times when no other symptoms of sphenoid disease are present. The neuritis is usually inflammatory in type, and is well advanced on one side while the other optic nerve is normal. It is frequently necessary to explore the sphenoid in such cases without other symptoms being present. Nor is it wise to wait too long on account of the danger of atrophy of the optic nerve.

It is very important for the sinuses and the eyes to be studied together. The eyes should be examined in case of sinus disease, and the sinuses should be carefully examined and perhaps explored if the type of ocular inflammation is suggestive."

DR. CHRISTIAN R. HOLMES, Cincinnati, Ohio, was interested to hear a paper of this subject. In a paper read before the Society ten years ago, at Pittsburg, on the relation of the sinuses to the orbit, he had made the statement that forty per cent. of all the affections of the eye, including asthenopic conditions, could be attributed to some form of sinus disease. As a young physician, twenty-five years ago, he had succeeded in making an impression upon a certain rich clientele by holding that affections of the eye could be treated successfully by attention to the nose and sinuses. Two children of a wealthy family had been cured, as if by magic, and the family had been good patients ever since. In 1896 he had reported the first case, so far as he knew, of the sphenoid being responsible for atrophy of the optic nerve. He presented plates at that time. The case was one of one-sided atrophic change. The man suffered such intense pain, and had become almost totally blind in the affected eye, so that it became necessary to act promptly. After the general surgeon, the neurologist, and the ophthalmologist had failed to relieve him, the speaker decided to open the sphenoid, and succeed in giving relief of all pain and gradual restoration of almost perfect vision. This patient had been under observation at intervals up to six months ago, when he died from pneumonia.

Ten or fifteen years ago, when rhinologists were using the cautery rather freely, he had seen retinal hemorrhage result from the too-frequent use of this instrument in the region of the middle turbinated bodies. He had also seen extensive thrombosis of the retinal vessels from a burn by the cautery. One of the most remarkable cases he had witnessed was that of a doctor, who was blind in the right eye, and growing so in the left eye. X-ray examination revealed pansinusitis. The man had iritis, floating masses in the vitreous, and detachment of the retina. He performed a Killian operation (radical). The iritis cleared up, the exudate was slowly absorbed, and the detached retina became re-attached. The man is still practising medicine.

DR. HANAU W. LOEB, St. Louis, Mo., considered anything important which added to the understanding of the vascular relations between the

nose and the eye; Dr. Coffin's paper, therefore, was a distinct contribution. The facilities which Dr. Coffin possessed for studying eye cases rendered his observations of value to this Society and others to which he belonged. The speaker's own work had been to show anatomic relations, but in no sense would he deny that the diseases under discussion could invade the orbit through the veins; they did not jump from the nose to the eye. They must pass through some medium. By means of autopsies and pathologic studies of cases of this sort it would be possible, in time, to reach more definite conclusions than were now warranted. He had had three cases of blindness due to ethmoidal disease, all of which were cured. The most characteristic of these was a boy, sent to him on account of inability to see more than the fingers immediately in front of his eyes. Immediately after cocainization the patient saw a man walk across the street, without any other treatment whatever. He wished especially to emphasize that ethmoidal disease was extremely common, whereas sphenoidal disease was less common. The relation of the sphenoid to the optic nerve was common; of the ethmoid less so. He wished again to present the thesis that with the nerve running along the posterior wall of the last ethmoidal, cell involvement of the optic nerve would more easily follow in ethmoidal disease.

DR. JOHN E. BROWN, Columbus, Ohio, called attention to the possibility of the subsidence of an acute infection of one or more of the accessory sinuses and the subsequent development of ocular symptoms that would lead the patient to consult an ophthalmologist. At this time careful intranasal examination, and in rare cases, even X-ray findings, might be negative. He had seen such cases. He had also seen others in which a history such as the above was not clear, but in which the usual treatment directed against the ocular—or optic nerve—lesion was not effectual, but when the ethmoid cells had been thoroughly drained by operation, there was a prompt disappearance or relief of the eye lesion.

DR. JOSEPH A. WHITE, Richmond, Va., referring to Dr. Thompson's statement that it was hardly necessary to take the maxillary sinus into consideration, cited a case. A lady had consulted him in July, 1916, for eye symptoms, headache, etc., but with vision of 20/15. She was relieved by the correction of a low grade astigmatism. In December she returned, with vision of 20/70, headache, and eye pain. X-ray examination revealed diseased teeth, with an abscess at the root of one tooth. The tooth was removed and the vision returned to 20/15. On February 4, the vision again became bad. The X-ray examination had shown no antral trouble, and transillumination was unsatisfactory. An exploratory opening was made in the antrum and pus found. It was irrigated, with immediate restoration of vision. On February 27, the vision was once more affected, and was restored by irrigation of the antrum. On March 24, she came again with bad vision. The ophthalmoscope showed nothing abnormal. The antrum was washed out and shreds of mucus found, but no pus. Vision was at once restored. This case, left alone, would probably have progressed to optic atrophy. Each time the vision failed irrigation of the antrum restored the sight to normal. The case illustrated the relationship between the optic nerve and the maxillary antrum. As the case was still under treatment a further report of its progress would be made.

Dr. Coffin, in closing the discussion, expressed the hope that a more sympathetic relationship with ophthalmologists would enable him to continue his investigations. Disease of the antrum, the sphenoid, the ethmoid, even disease of the nasal cavities, came in the same category with reference to the relationship to the optic nerve. Involvement of the cell most distant from the nerve might, through the circulatory relationship, give rise to trouble.

**Changing Methods and Advances in the Treatment of Progressive Deafness From Chronic Secretory Otitis Media.**—DR. FRANCIS P. EMERSON, Boston, Mass.

The question, among others, of the diagnosis, prognosis, and treatment of that form of progressive deafness which is the result of chronic secretory otitis media, should be considered at stated intervals, inasmuch as otology was not an exact science, and as its relationships to rhinology were as yet incompletely correlated. Otologists might be divided, with respect to the production of the middle ear, into two classes: those whose treatment was almost wholly confined to the epipharynx and Rosenmüller's fossae, and those who corrected all deformities of the septum and abnormal conditions of the turbinates, drained the sinuses, removed tonsils, et cetera.

In order that he might not misconstrue the attitude of the first group—those who laid especial emphasis on the epipharynx—the writer had sent the following question to fifteen prominent aurists: "Given a case of progressive deafness as the result of chronic secretory otitis media, where the hearing for the whispered voice has been reduced to 15/25ths, or less, would you expect any improvement from treatment of the nasopharynx, excluding the epipharynx and inflation?" Replies were received from ten, all of whom said they would not expect any benefit, provided the lymphoid tissue in the vault and fossae had been thoroughly removed. One considered such a case as a beginning otosclerosis, and one had seen active operative measures do harm.

To prove that positive improvement in hearing resulted from the cure of remote foci was not an easy problem, as the testimony of the patient, or of the aurist, was of no scientific value unless such observations were supported by careful hearing tests, and records covering a term of years, for one was dealing with a chronic disease, subject to acute exacerbations, and varying acuity of hearing. Further, in order that such records should be available for analysis, such observations should extend over a period of from three to five years. From his study of the subject the following conclusions were drawn:

"(1) Every case of chronic progressive middle ear deafness has a primary focus.

"(2) Such primary focus is usually constant for the individual.

"(3) Every case showing variable hearing can usually be improved up to their best hearing.

"(4) Inflation in chronic cases is unscientific and harmful as a routine.

"(5) Nasal obstructions do no harm to the middle ear unless infection is present.

"(6) Foci wherever found are potential factors in the progress of chronic progressive otitis media.

"(7) No hearing test will forecast the improvement in a given case as long as we have a positive Rinné with variable hearing.

"(8) Whatever the microscopic appearance of the membrana tympani, the cause of the deafness is active for a long time outside the middle ear as a toxemia or low grade infection subject to acute exacerbations.

Three illustrative cases were presented in detail.

**Primary Disease of the Labyrinth as the Result of Focal Infection. DR.**

GEORGE E. SHAMBAUGH, Chicago, Ill.

The clinical phenomena observed in cases of primary involvement of the internal ear as the result of focal infection were quite definite, although the symptoms varied more or less widely in different cases. The defect in hearing was always quite characteristic. It began as a defect in the upper part of the tone scale, while the hearing at the lower part of the tone scale remained even after the defect for the higher notes had become quite extensive. The loss of hearing might consist of a defect more or less circumscribed in the middle of the tone scale. Paracusis Willisii was never a symptom in these cases, and tinnitus aurium was seldom the annoying symptom which it so frequently was in cases of otosclerosis. In most cases both ears became involved sooner or later, the shortening of bone conduction, in such event, being always present. In one-sided involvement the positive Rinné would be changed to a negative, in those cases where the defect in hearing was quite marked.

Symptoms arising from the vestibular part of the internal ear constituted a very important part of the clinical phenomena observed in many of these cases. Primary disease of the internal ear constituted the most frequent cause of vertigo. Primary degeneration of the vestibular nerve occurred quite independently of a similar process involving the cochlear nerve. In these cases an occasional attack of vertigo was the only symptom indicating disease of the labyrinth. Three distinct types of primary degeneration in the labyrinth might be encountered: first, where the cochlea alone was involved, producing nerve deafness and more or less tinnitus; second, where the vestibule was involved simultaneously with the cochlea, producing, as a rule, occasional attacks of vertigo in addition to the symptoms arising from disease of the cochlea; third, where the vestibular nerve alone was affected, and where all symptoms indicating disease of the labyrinth might be absent, except for possible occasional attacks of vertigo.

The progress of the disease differed widely in different cases. There might be a gradual increasing degeneration of the parts involved; the progress of the degeneration might be accelerated by acute exacerbations; or the acute attacks might be followed by a long period of quiescence.

Primary degeneration of the labyrinth was not infrequently a complication of syphilis, hereditary or acquired. It was also observed as a sequel of the infectious fevers, especially mumps, typhoid, measles, and scarlet fever. In a large percentage of cases, however, the etiology was not accounted for. It was in these cases that focal infection was suggested as a possible cause. The similarity between the manner in which the labyrinth involvement took place and the involvement of other nerves where focal infection was known to be the cause, suggested this conclusion.

Four cases, illustrative of primary disease of the labyrinth originating in focal infection, were presented.

## DISCUSSION.

DR. MAX A. GOLDSTEIN, St. Louis, Mo., thought the consensus of opinion very well reflected in the two papers, leaving very little room for difference of opinion save concerning minor points. He took issue with Dr. Emerson as to the nomenclature and the term chronic progressive middle ear deafness. The functional tests now available made it possible to differentiate between chronic catarrhal and chronic otosclerotic processes. Focal processes in the middle ear could be reached from the naso-pharyngeal end of the tube. The treatment of otosclerosis in any stage showed little if any definite effect so far as the end results were concerned. He doubted if sufficient progress had been made with reference to the spongyfying process or fixed end of the stapes to say anything about therapy. However discouraging it might be, the fact remained that very little value could be attached to any form of treatment in clearly defined, clinically differentiated otosclerosis. He could not refrain, in the light of this doubtful state of affairs, from emphasizing the importance of giving attention to the education of the patient in efficient lip reading.

DR. HANAU LOEB, St. Louis, Mo., concurred in what Dr. Shambaugh had said concerning the likelihood of a focal origin of these obscure symptoms, which might be called vertiginous symptoms, so often referred to the labyrinth. Abscess at the roots of the teeth, in his opinion, was more apt to be the cause than infection of the tonsils. He had had several cases of this type. In one the seventh nerve was affected, with spontaneous nystagmus and deafness. Facial paralysis, nystagmus, and then deafness, was the order of disappearance of symptoms. The teeth were the cause in this case.

The subject presented by Dr. Shambaugh was a very important one, and would doubtless, in time, help to clear up the cause of Ménière's disease, disturbances of the eighth nerve, and other obscure conditions.

DR. HENRY HORN, San Francisco, Cal., thought it quite significant that the two essays were grouped together for discussion. He ventured to prognosticate that within five years the condition considered by Dr. Emerson, otosclerosis, and all other middle ear affections, would no longer persist as clinical entities. The trend of opinion was leading more and more clearly to the conclusion that middle ear disease is always accompanied by more or less involvement of the labyrinth. The examination of recruits for the aviation service would give otologists an opportunity to examine an enormous number of normal individuals in an absolutely uniform and methodical manner. The conditions under discussion had been obscure because of the lack of a methodical manner of making the tests. The diagnosis, therefore, had been largely a matter of the examiner's personal equation. It had been brought out recently, in Philadelphia, that a large number of otherwise absolutely normal individuals had some involvement of the labyrinth. The conclusion would finally be reached that focal infection is the cause of every one of these diseases.

DR. GEORGE W. MACKENZIE, Philadelphia, Pa., directed attention to the fact that there might be quite a number of conditions referable to the ear that might cause tinitis, vertigo, nystagmus and equilibrium dis-



turbances—(a) congestion of the internal ear manifested by increased nystagmus to the side of the lesion, together with vertigo and past-pointing; (b) there might be also a plastic condition secondary to chronic middle ear suppuration; (c) a spongifying process might, in its turn, invade the osseous labyrinth; (d) labyrinthitis of the circumscribed or diffuse type; (e) nerve lesions following infectious fevers—the post-infectious type of neuritis; (f) a granulomatous inflammation; (g) toxic inflammation due to lead, alcohol, etc.; (h) retro-labyrinthine inflammation leading to primary atrophy, in syphilis; (i) neuritis, of the so-called refrigeratory type from a draft of cold, damp air. Cases of this type had been studied microscopically, and a round-celled infiltration found, but without microorganisms. Doubtless many of the cases reported really came within this class. By what test could one differentiate between a lesion in the nerve and one in the internal ear during life? The galvanic test was the one only test for differentiation between inner ear and nerve lesions.

Dr. Emerson, in closing the discussion, said he had tried to define the type of middle ear under discussion, stating that in this type there was no change in bone conduction, in the promontory, or in the low notes, and that they were therefore in the category of cases of chronic secretory otitis media.

Dr. Shambaugh, in closing the discussion, said that otologists were fairly well satisfied as regards the treatment of the suppurative cases of chronic otitis media, but these formed only a small part of the chronic middle ear cases. The treatment of the non-suppurative cases through the Eustachian tube accomplished much more for the acute and sub-acute conditions than it did for the chronic cases. Long continued treatment of a chronic case via the tube, that is by inflammation, not infrequently resulted in a permanent injury due to over-stretching of the drum membrane. It was much more important that a careful search be made for the foci of infection in the upper respiratory tract which acted as the underlying cause for the changes in the middle ear.

In cases of otosclerosis heredity seemed to play a very important part, and yet an inherited tendency to this condition might remain latent in an individual until it was stimulated and brought out by some infection. An analogous condition was seen in cases of chronic arthritis deformans. There appeared to be not infrequently a hereditary tendency and yet the process was undoubtedly stimulated into activity by some focus of infection.



